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ORIGINAL ARTICLES.

A CASE OF MULTIPLE DOUBLE LIPODERMOIDS OF THE CONJUNCTIVÆ AND CORNEA, ACCOMPANIED BY INTRABULBAR AND OTHER ANOMALIES.*

By K. L. Stoll, M.D.,
CINCINNATI, OHIO.

Miss W. J., age 33 years, was referred to me on June 17, 1908. She is the descendant of a family belonging to the first white settlers in this part of the country. Her parents were children of two sisters. She is the third and last child, having two brothers, the elder of whom is normal in every respect, while the younger bears some traits of degeneracy. He is of a peculiar character, irregular in his habits, potator periodicus, has a compound myopic astigmatism of 3.0 and 3.50, and floating opacities of the vitreous body of both eyes. His eyes do not show any changes due to irido-cyclitis and chorio-retinitis or malformations. His face is very asymmetric, the right parietal portion of the skull being more developed than the left. No history of syphilis or tuberculosis in the family. The father was tall and strong and died in his seventieth year; the mother was short and heavy. She died when about 68 years of age, of nephritis.

The patient herself is of rather graceful build, light of weight, but healthy, strong and of normal intellect. Her melancholy disposition is probably due to her being hampered by the condition of her eyes since childhood. When asked about the duration of her eye-trouble, she said that the white growths had existed in her eyes from infancy, but that they grew as she grew taller, and that they increased in size especially since her sixteenth year. During the last years the condition became intolerable on account of long hairs growing on the tumors, which she used to pull out as soon as they were long enough to protrude between the lids. She was able to get a fair common-school education and even visited a high-school for a year or two. The reason for not having had her eyes attended to when younger, was the warning of an old doctor of her town, who told the parents that the eyes would run out, if an attempt were made to remove the growths.

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*Read at the meeting of the Cincinnati Research Society, Dec. 5, 1912.

In front of the left ear we find the remnants of some polyotic growths which had been removed in her childhood, leaving a stellated and slightly retracted, whitish scar, in the centre of which two elevations arise, about 8 mm. in diameter. One of them is entirely a formation of the skin and is freely movable, while the other is hard and adherent to the cartilage of the antitragus. The portion removed was the size of a large cherry, according to the patient's statement.

The right side of her face is better developed than the left, the ridge of the nose slightly turned toward the right side and the septum toward the left side. Dr. A. C. Wintermeyer, of Covington, Ky., her family physician, to whom I am greatly indebted for this case, tells me that she bears no other anomalies on her body.

Right Eye.—Cornea clear, anterior chamber and iris normal; pupil, like that of the left eye, is round and of normal reaction upon light and accommodation; consensual reaction prompt. Lids bear no irregularities but are slightly puffed, especially at the temporal side, where a solid prominence can be felt under the lower lid. Upon pulling the upper lid away from the globe, a bag-shaped tumor appears, which is dotted with fine lanugo and some long black hairs. They are arranged practically in one line along the longitudinal axis of the tumor, which terminates upward and downward in two conjunctival folds. The lower one is seen to fuse into another tumor of bulkier appearance, becoming more prominent as the lower lid is pulled downward, but of about the same length as the first. It bears less lanugo, but a greater number of long hairs, some measuring 14 and 16 mm. This second tumor sends a conjunctival fold up to the lower temporal margin of the cornea, where it terminates without touching it. Both tumors spring from the fornix, have a yellowish-pink hue and are freely movable. Each measures about 14 mm. in the longitudinal axis. There is a good deal of epiphora and conjunctival irritation in both eyes, great photophobia, and also some white, sebaceous secretion on the exposed portions of the tumors of both eyes. (See Fig. 1.)

Left Eye.—Lids like those of the right eye, but upper lid more prominent. At the junction of the nasal to the middle third of the upper lid, there is an intimation of a coloboma, namely a notched defect of the palpebral margin, retracted and void of even a trace of cilia. Although small in extension, it is located at the favorite seat of the lid-colobomata. It is evident in Fig. 3. As the patient opens her eye, we see on the lower temporal quadrant of the cornea, a white opaque macula, about 2 mm. wide and situated right central of a yellowish-pink tumor, which extends over the margin for about 2 mm. (see Fig. 2). It is dotted with black hairs and extends downward and temporally to the fornix, where it forms a distinct demarcating sulcus before merging into another tumor. This tumor is situated nearly at right angles to the first, running along the fornix. Its lower termination extends below the spot where the two tumors meet and is slightly turned away from the fold of transition. The upper end, however, is seen to join a third tumor, which will bulge forward very bulkily upon pulling the upper lid up and toward the temporal side. This tumor is the largest and bears the longest hairs, some of which extend over the cornea or disappear in the upper fold of transition or hang over the lid. Some of them

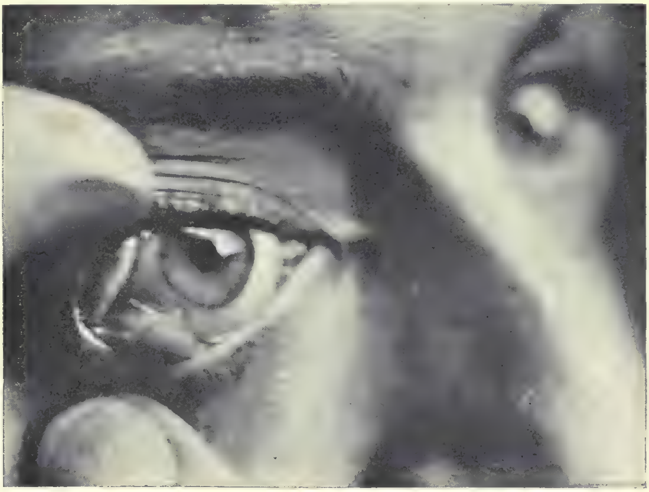


Fig. 1.

measure from 8 to 12 millimeters. The tumor reaches along the fornix as far nasally as to point above the nasal corneo-scleral margin. A fourth tumor, which is absolutely isolated from the others, appears when the lower lid is pulled down. This is thinner and less protruding than the others, but reaches up to the semi-lunar fold, into the tissue of which it is seen to merge. It is void of hairs and lanugo. (See Fig. 3.)

The *ophthalmoscope* reveals in both eyes about 5 D. myopia and astigmatism, some floating opacities, but no chorio-retinal changes, although the patient complains of hemeralopia. The media of the right eye are clear; its disc shows a slight physiologic excavation. The left eye offers some interesting points: a posterior polar cataract directly in the pole and a smaller paracentral dot a trifle above and nasally from the first. At the upper temporal margin of the disc we see a short brown line, which is slightly prominent, the rudiment of the hyaloid artery.

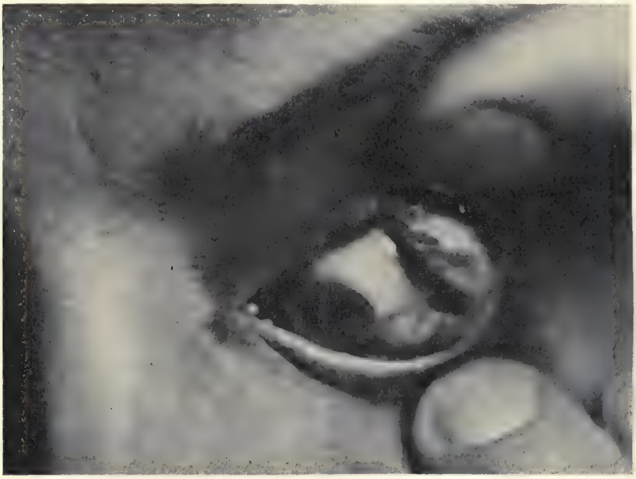


Fig. 2.

R.V.=15/100; L.V.=15/200. Exact test impossible on account of the photophobia.

The *operation* was performed under chloroform on July 9th, 1908. Week's speculum, Desmarres' elevators, or fingers were used in turn to separate the lids, as necessity demanded. Great care was taken to preserve as much of the conjunctival tissue as possible, so as to prevent the formation of shortening scars or of an actual symblepharon. (For orientation see the sketch.)

Left Eye.—The upper tumor was grasped with a forceps and a section made through the conjunctiva vertical to the long axis of the tumor, then two sections were made (with a Graefe knife) above and below the hairy ridge as far temporarily as to the junction with the adjoining tumor (c). After this the tumor was prepared free from its substratum. It proved to be isolated from the first tumor but for a few shreds and several folds of conjunctiva stretching from one tumor to the other. The tumor (G) crossing the corneal border was removed in the manner in which a pterygium is freed. After separating it from the cornea, with a Graefe knife, it had to be freed from Tenon's capsule, with which it was connected by emissary bands.

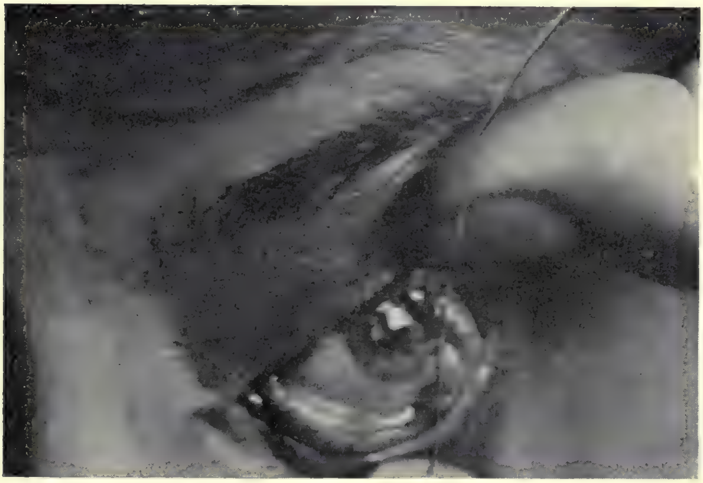
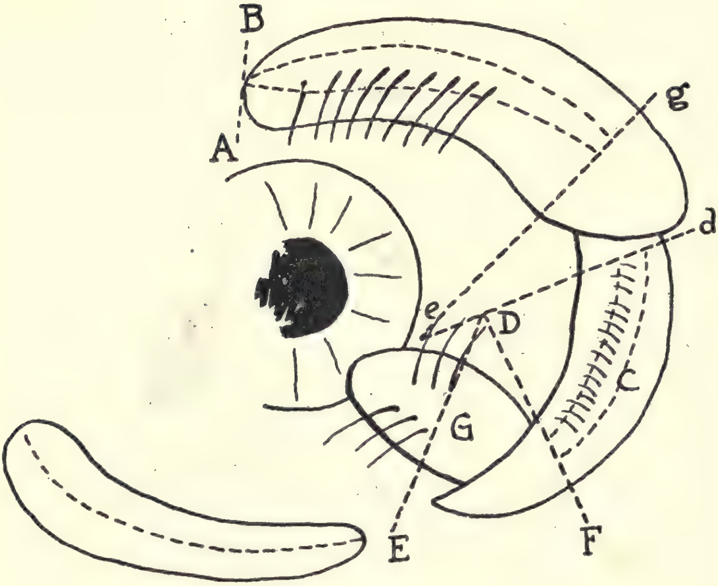


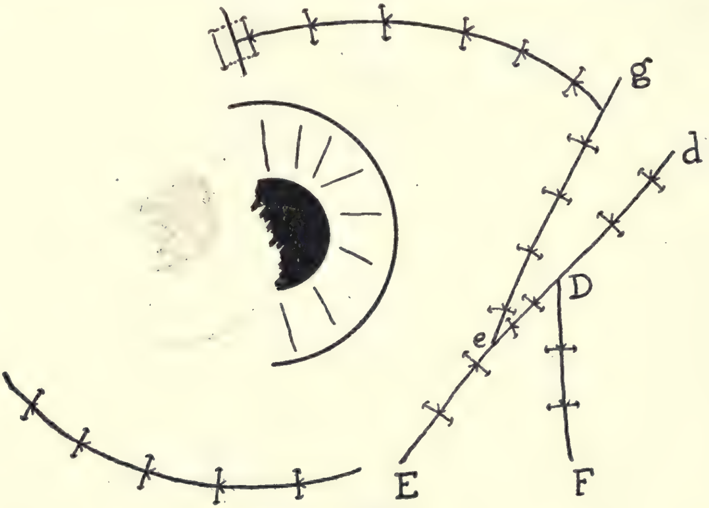
Fig. 3.

A similar condition was encountered in the first tumor. Over both the conjunctiva was immovable and covered with hairs, so that a good deal had to be sacrificed. Two important questions now presented themselves: first, the closure of the defect in the conjunctiva without recourse to subsequent skin-grafting, and, secondly, the prevention of a symblepharon. After complete removal of these tumors, a narrow strip of healthy conjunctiva (E, D, F,) was loosened from its fatty substratum by carefully dissecting it off with a Graefe knife. During this procedure the lids had to be turned inside out, so that neither a speculum nor elevators could be used. This rendered the task more difficult. The fourth tumor was readily removed. Only



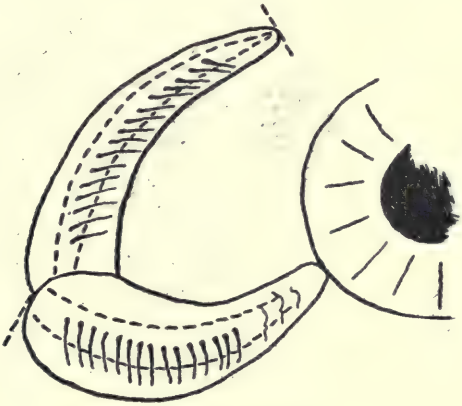
Sketch I. Left Eye.

the narrow central ridge of the conjunctiva, which adhered to the tumor, had to be sacrificed. Adrenalin was instilled to stop

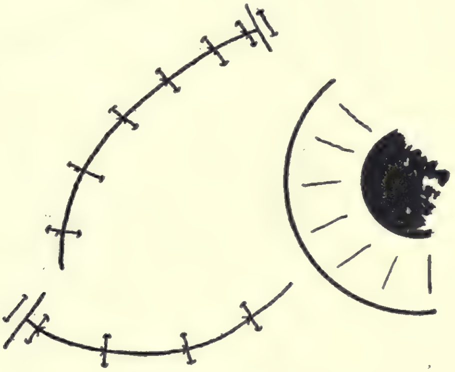


Sketch II. Left Eye.

what little hæmorrhage had occurred, and a pad of cotton soaked in boric acid solution was placed over the eye, while the right eye was operated on. The wound of the left eye was closed in the following manner (see sketch No. II). The nasal end of the wound left by removing the tumor under the upper lid, was united by a double-armed thread in the fashion of a mattress-suture, closing the short perpendicular section (A, B) and the nasal termination of the wound made along the hairy ridge of this tumor. Its temporal end was united in the same manner. Three simple sutures were considered sufficient to adapt the wound lips completely.



Sketch III. Right Eye.



Sketch IV. Right Eye.

Besides the flap (E, D, F) another flap (g, e, d) was formed from that portion of the conjunctiva, which was loosely arranged like a bridge at the junction of the tumors near the external canthus. This second flap (g, e, d) with its apex turned toward the cornea was used in covering the upper half of the gap, while the first (E, D, F) was pulled up into close proximity to the former. They were sewed to one another along their edges (D, E and d, e), and with deep sutures anchored to the episcleral tissue. After this, the proximal edge (e, g) of the upper flap, was united to the conjunctival tissue which remained between the upper portion of the gap and the cornea, while the distal edge (D, F) of the lower flap was united to the conjunctiva temporally to it. In this manner only a small defect remained near where the tumor had crossed the corneo-scleral border. There the tip (e) of the higher flap was fixed by a deep scleral suture, as they are used in advancement operations. The gap resulting after the removal of the tumor of the lower lid was closed in the same manner as that of the upper fornix.

Right Eye.—The right eye did not offer any difficulty. The baggy conjunctival fold, leading toward the cornea from below and temporally was slit and furnished tissue enough to cover a gap which was left after the removal of the canthus portion of the growths. The conjunctiva along the fornices was readily united, safe-guarding against the formation of a symblepharon. Usual toilette of the eyes. Bandage.

July 10th: No after-effect of the narcosis, no pain in the eyes. Had a good night's rest.

July 11th: First change of bandage; the lids were slightly swollen, some mucous discharge on the eye-lashes. Both corneæ free from irritation; sutures in position.

July 13th: Wounds free from reaction and healed; the flaps well adapted. Removed the sutures.

July 14th: Patient struck her left eye last night. The temporal third of the upper lid is red and more swollen, but nothing disturbed inside the lids.

July 15th: Eyes left open for the first time.

July 16th: Was allowed to read this afternoon.

On July 24th, the eyes were examined. Patient had never worn any glasses and was in the habit of closing her left eye whenever she wanted to see distinctly. When examined with the red glass, she had double-images, which, however, fused immediately. The muscles of the right eye were balanced, having, however, a tendency to esophoria; left eye slight esophoria.

R.V.=15/100; R—5.0=15/40. Near: Sn No=2. Finest print better without glasses. L.V.=10/100; L—3.0=15/150. This correction was ordered for the distance. In November, 1908, she had R—4.5⊃—0.5 c. ax. 180° V=15/30. Since then there was no change of the vision of her right eye. In the left she had

—2.0 c. ax. 90=+0.5 c. ax. 180°V=15/100. When seen last, on May 15th, 1912, her eyes were in perfect condition; her vision had not changed. She reports, however, that she is still troubled with difficulty of vision in subdued light and dusk. This symptom, hemeralopia, is frequently mentioned in connection with lipodermoids. The upper lid of the left eye is still slightly drooping, which leads me to believe that we have to deal with a distinct, though moderate degree of congenital ptosis. The pupils were normal in appearance and function.

MICROSCOPIC EXAMINATION.

The tumors were hardened in the usual manner with formalin and afterwards alcohol of increasing strength. All the tumors, excepting that of the corneo-scleral margin and that which was located below the lower lid of the left eye, offered the following constituents of lipodermoids. The surfaces, slightly uneven and furrowed by folds, which were, in a way, evident in life, are formed of several layers of epithelium. The cells are of varying height, being more cylindrical below. There are numerous cones and extensions stretching into the substratum, forming papillæ of irregular shape. Numerous hair follicles, with hairs of every caliber and several types of glands, appear in every section. Goblet-cells, closed or voiding their contents, are arranged in nests at several localities. The superficial epithelial cells are frequently horny, although this process of cornification is limited to only one or two layers. Many of these cells are being cast off or are fully detached from their neighbors. Below the epithelium we see a substratum formed of fat, which is strongly intermixed with blood-vessels of varying size, and connective tissue. It bears a few nerves and muscle-fibres at various localities.

The area forming the most prominent crests of the tumors, shows round and migrating cells, some proliferation of the epithelial cells and of the connective tissue, slight infiltration of the walls of the blood-vessels which are especially numerous here. The glands appear larger and send off larger lobes, the sweat glands are more coiled, their lumina wider and filled with a substance tinted by the eosin with a pink hue. Foci of inflammation can be seen surrounding the glands and affecting slightly their trabecles.

The tumor on the corneo-scleral margin shows a similar arrangement and the same constituents, but shows far stronger cornification. The surface is covered by loose horny cells, a number of which are being detached singly or in small leaves, which are composed of three to five in a line, and show occasionally double rows. A great number of lanugo hairs and a few thick ones are distributed irregularly.

The great portion of all these tumors is made up of fat, interspersed with connective tissue strands, some larger alveolar glands, sweat glands, some bundles of muscle-fibres and the cross and longitudinal sections of numerous bloodvessels. Some of the epithelial cones extend far into this zone.

The type of the tumor of the left lower fold of transition is decidedly lipomatous, with but a few dermoid admixtures. Its epithelium is very thin, although composed of several layers of cells, forming an almost homogenously deep cover. There are no hairs and only a few glands in evidence; the cones extending from the epithelium are short and small, and limited to the zone directly below it. The connective tissue of this substratum is rather scant and bears no muscles or nerve-fibres. Neither does it contain the wealth of glands met with in the other tumors.

THIS CASE OFFERS THE FOLLOWING INTERESTING FEATURES:

(1) The double multiple lipodermoids were accompanied by a number of other anomalies; asymmetry of the face and deflection of the nose; coloboma and ptosis of one upper lid; congenital macula corneæ of the left eye; posterior polar and posterior punctate cataract, also rudiment of the hyaloid artery in the left eye; hemeralopia, astigmatism and a certain degree of amblyopia; polyotic growths; consanguinity of the parents. Similar changes in the lens have not been reported in any publication. Their presence is not surprising, because every conceivable malformation may occur. Hanke[1] found even an intraocular dermoid and he, as well as E. von Hippel,[2] found rudimentary eyeballs hidden in the lipo-dermoid masses. In one of Hippel's cases the eyecup had not closed and a rudiment of the lens was found imbedded in the dermoid tissue covering the eye. This condition proves to him the correctness of the "amniotic" theory. De Kleijn and Nieuwenhuysen[3] express the same opinion in a very interesting article on malformations caused by intra-uterine injury. Van Duyse's[4] theory of the dermoids being due to amniotic adhesions to the eye, is also supported by Lannelongue and Vassaux. Ptosis and deformity of the papilla were found by C. Hirsch[17] in a case published by him this summer.

(2) The number of individual growths in each eye is un-

usual. More than two are rarely met with in one eye. Ayres[5] quotes a case of Noyes, with three; Hommelsheim[6] one of Gand, with the same number; while Saemisch[7] mentions no case of more than two, with the exception of Kotter's case of a baby with several tumors of the corneo-scleral margin. Wagenmann,[8] in his recent article, does not refer but to one of Nobbe's cases with two corneo-scleral and one conjunctival growths in one eye of a child, and to one case of his own[9] with one corneo-scleral and two sub-conjunctival lipodermoids. The condition of the left eye with four distinctly separated growths is unique up to the present date. The closest resemblance to this case as regards number of growths is borne by an illustration in the textbook of Fuchs.[10] The foot-note, however, explains that one growth consists of three lobules.

(3) The simultaneous occurrence of corneo-scleral and subconjunctival growths of the folds of transition and their "confluence" is noteworthy. Only four such cases have been reported: two by von Graefe,[11-12] one by Riecke[13] and one by A. Alt.[14] This confluence is for Wagenmann (l.c.) one of the proofs for the relationship of the two types of lipodermoids and for their analogous origin with the teratoid formations. Up to the publication of Graefe's second case, the simulataneous presence of these two species had been doubted. In addition it may be said that Hommelsheim (l.c., p. 43) published four cases of Vossius, in which the growths extended from the fold of transition to the cornea.

(4) An inspection of the accompanying sketch shows a certain symmetrical arrangement of the growths of both eyes. Vossius[15] has pointed to this symmetry in pure subconjunctival lipomata, while Landolt[16] demonstrated a case with a similar symmetrical condition of lipodermoids of the upper fornices.

(5) Very extraordinary is the presence of the entirely isolated growth on the lower fornix of the left eye. Its location and nature are equally unusual. It is void of hairs and practically free from glandular and cutaneous formations. This condition renders it a close relative to the pure lipomata of the fold of transition. The existence of pure lipomata in this region has been denied or doubted by Nobbe,[18] Ewetzky,[19] and Riecke.[13] Other writers, like Rogman,[20] Lagrange,[21] and Ahlström,[22] made serial sections and found them, following Nobbe's suggestion, who demanded for the diagnosis of a pure sub-conjunctival lipoma, the proof of serial sections.

(6) The presence in this case, of long hairs on the conjunctival growths of the folds of transition, is rare according to Wagenmann (l.c., p. 511). He quotes one case in which such hairs grew 2.5 cm. within six weeks. Nobbe mentions two similar cases with hairs measuring 0.7 cm., and Hommelsheim[6] refers to one of Bögel's[23] cases where hairs were found in the same location and also on a tumor situated near the external canthus similarly to our case.

(7) The location of the growth is unusual. Nobbe found 70 per cent. of his lipodermoids situated in the area between the superior and temporal recti muscles, although their location in other parts of the conjunctival sac is by no means rare. In a case of Hirschberg and Birnbacher[24] they were found in and behind the equator of the eye. The seat of one tumor at the external canthus of the left eye of our patient is rare, and occurred only in three more cases, referred to by C. Hirsch.[17] The location of the fourth tumor of the left eye on the lower fornix is unparalleled. Typical is the location of the small coloboma of the upper lids. It is too small and the tumors are too large to establish any idea as to their correspondence in position, to which Kosticz[25] referred when demonstrating a strikingly illustrative case last year.

(8) All the growths in both eyes were freely movable with the exception of the one crossing the corneal margin. This is contrary to the differential diagnostic postulate between pure lipomata and dermolipomata of the conjunctiva made by some textbooks. They declare the former movable, the latter attached to the sclera by emissary fibres continuous with those of the sclera. The emissary fibres described above did not lessen the movability of the growths in the present case. Of a number of similar cases, one of Natanson[26] may be mentioned. Our case is also an exception to the rule of Nobbe, which was recently accepted by Wagenmann, that the corneo-scleral growths represent more purely the lipodermoid character, while those of the periphery and of the fornices are poorer of cutaneous formation.

(9) Symptoms of irritation and inflammation were observed in accordance with several publications. It is remarkable that these growths show no tendency to become malignant. All the formations derived from the three germinal layers have been found in them. Hippel[27] found even elements of the respiratory and alimentary tracts in one lipodermoid. Only one case of

malignant degeneration was published by Gunn,[28] who discovered fibrous cartilage in a subconjunctival dermoid. Gallenga[29] contended that here the glandular tissue had undergone a degenerative change into fibrous connective tissue and cartilage. The tumor represented, in his opinion, a chondro-fibroma or chondroma.

(10) These growths, causing Miss W. J. certain discomfort during her whole life, became more annoying about her thirtieth year. According to Saemisch (l.c., p. 608) this is abnormal; the process of growing commonly ceases about the age of puberty. Exceptions to this rule are met with. Wallenberg[30] describes the case of a man in whom the lipodermoids became troublesome not before his 25th year of life. The opinion of von Graefe is accepted that the more abundant the fat in conjunctival tumors, the greater the probability of their growing in later years. In our case, however, the isolated and almost purely lipomatous tumor on the left lower fornix was the smallest.

(11) Like the larger percentage of patients afflicted with this type of growths, ours was a woman. Nine of 13 cases described by Hommelsheim[6] belonged to the female sex. He quotes Hock, stating, in 1877, that "almost every known case occurred in females." This predominence may be explained by the fact that the greater portion of these benign growths cause no discomfort and that their removal is sought merely for cosmetic purposes in many instances.

(12) As to cornification of the epithelium, this case is an exception to Parsons'[33] stipulation, who said, that the conjunctiva becomes horny where it projects between the lids. In our case this change took place in a distinct, though lesser degree, on the ridges or crests of some portions constantly covered by the lids. There was, however, in this case, no evidence of cartilage as described by Gallenga, Alt, Riecke; nor of bone as found by Wagenmann, Gallenga, Ahlström, Contino[31] in subconjunctival lipodermoids, and by Cohn[32] in a dermoid of the cornea.

(13) The operation is rarely as complicated as that performed on Miss W. J.'s left eye, although some detailed descriptions were deemed necessary by some authors, like Wagenmann (l.c.) and Baquis[34] and Hirschberg.[24]

(14) That complete removal of these formations renders a relapse impossible, is obvious.

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ON CERTAIN OCULAR PHÆNOMENA IN THEIR RELATION TO THE DIAGNOSIS OF INTRACRANIAL DISEASE.*

By N. M. Semple, M.D.
ST. LOUIS, MO.

Fully aware that the members of the Society have been rather surfeited lately with set papers on the subject of ocular lesions as an aid to the diagnosis of intracranial disease, I shall limit my remarks to the consideration of a few important points, especially those exemplified in the histories of three cases, which I shall report to the Society.

Cushing has emphasized the value of a transient abducens paresis as an important, and often the earliest, symptom of increased intracranial pressure. Dr. Sachs, in a paper read before the Ophthalmic section of the St. Louis Medical Society, referred to a case where this was the first sign of trouble—shown subjectively by an intermittent diplopia. I shall speak of this case more in detail later, as one presenting many interesting features.

The fact that we occasionally find an abducens palsy as the first sign post, pointing to an approaching tabes, or cerebral syphilis, makes a close study of this symptom of the greatest moment. Its transient nature renders any conclusion that may be drawn from the use of mercury or potassium iodide entirely useless. The employment of the Wassermann reaction, a continuous and careful observation of the pupillary reactions, repeated takings of the fields of vision, watching of the optic discs over prolonged periods of time, all may be necessary for an eventual correct diagnosis.

The explanation of the abducens paresis in increased intracranial pressure which seems to be generally accepted is the one offered by Cushing—that it is caused by direct pressure upon the nerve by the basilar artery in its course over the pons—the nerve lying between the artery and the pons. In the case referred to above and mentioned by Dr. Sachs as an example of this condition, as well as in tumors generally of the base of the skull and the pons, a more probable explanation would be, it seems to me, that of direct pressure upon the nerve. Either lying between the growth and the resistant pons above—or the growth and the bony structure beneath.

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*Read before the St. Louis Ophthalmological Society, Dec. 9, 1912.

A reason for the abducens paresis as an early symptom of tabes has not been, as far as I know, satisfactorily given.

The involvement of the oculomotorius is, in a great majority of the cases, of nuclear origin. This is especially true in a paralysis of the accommodation with dilatation of the pupil—phænomena strongly pointing to cerebral syphilis. Its affection in tabes, multiple sclerosis, syringomyelia is usually at a stage where the diagnosis is materially aided by other signs of the disease. Emerging in front of the pons, running forward well to the side of the sella turcica, it seems to escape any effect of an increased intracranial tension, and is rarely directly affected by any growth at the base of the skull. Yet that its involvement does occur and can be of diagnostic value when associated with other ocular symptoms is shown by a case which I shall describe later. Here the connection of the nucleus of the third nerve with the superior colliculus and the visual cortical area through the corticofugal secondary optic radiations might explain the clinical phænomena.

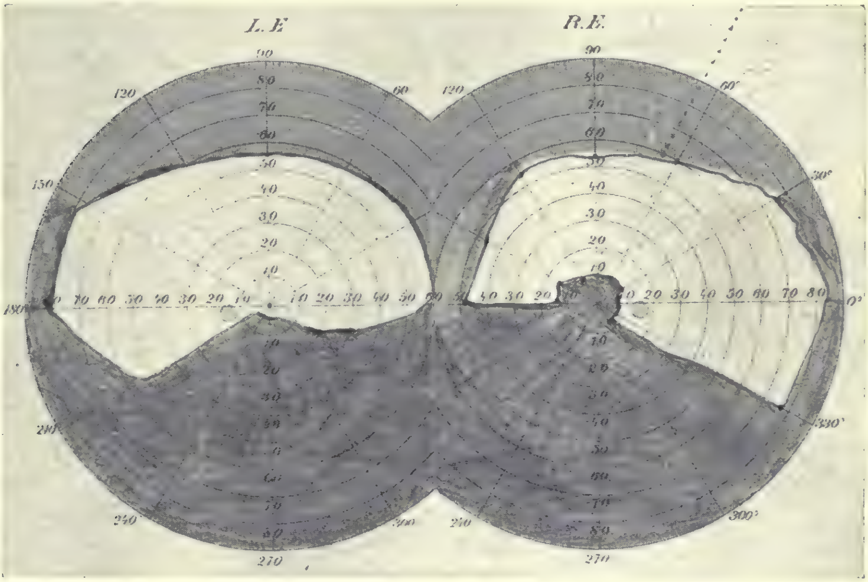
Bitemporal hemianopsia, as you know, bespeaks an involvement of the crossed fibres in the anterior or posterior part of the chiasm. If the sense of smell is at the same time affected, this would point to a lesion of the anterior portion of the chiasm. An extension of the lesion backwards, involving the tracts immediately behind the chiasm, would give very positive evidence of its location.

In homonymous hemianopsia, there are certain conditions of value in localizing the diseased process. Where there are sector defects with the part peripheral to the defect intact, or with more or less complete hemianopsia with central vision unaffected, an involvement of the cortical area is indicated. On the other hand, when the involvement of the fields extends from the periphery centralwards, eventually including the macular fibres, especially when both crossed and uncrossed fibres are affected either above or below, the process is evidently in the tracts—this latter condition being well shown in the first case which I shall report.

The histories of the following three cases are illustrative of the points to which I have briefly called your attention.

Case I.—C. C., age 33, male, was referred to me by Dr. Fry November 6, 1911. The first symptom of trouble was a diplopia, appearing in January, 1910, which was transient. Some weeks later the patient began to suffer from headaches, which were attributed to the use of the eyes in near work. It was not until August that these became sufficiently severe to cause the patient to seek a consultation. He was then examined by Dr. A. E. Ewing, who found his vision 20/19+ in each eye. The fundi were normal. At this time the excursion of the right eye was only 45° outwards on forced abduction. The patient was again examined by Dr. Ewing in October and the condition found unchanged. The man was not seen again until November of the following year (1911), when he was brought to Dr. Fry, almost two years after the initial symptom of right abducens paresis.

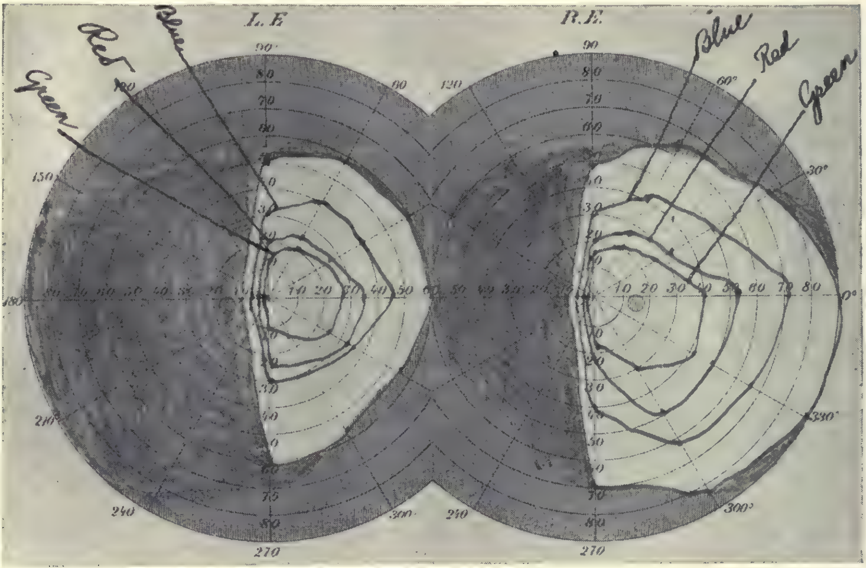
Date, November 6, 1911.
Test Object. 1 cc. sq. motion



CASE I.

The headaches had become paroxysmally very severe, latterly accompanied by intense vertigo and vomiting. The patient had often to raise himself very slowly to prevent the extreme vertigo. The right side of the pharynx, back of the pillar, was found hyperæsthetic to cotton and pressure. Tongue possibly hyperæsthetic, and somewhat tremulous on protrusion—more marked on left side.

The ocular examination showed the vision of the right eye to equal movements of hand at one foot. Vision of left eye 3/75. The right optic disc was markedly atrophic, the left showed a choked disc of six dioptres. There was a complete loss of the lower half of the right field of vision except 30° below the horizontal line of the temporal side, together with a complete involvement of the macular region. (See Fig.) The left field gave a similar condition with the exception of the preservation of central vision (3/75). The right pupil was somewhat larger than the left—both reacting to light and accommodation. The action of the extrinsic muscles was good, except of the right abducens on extreme abduction. The ocular symptoms here clearly pointed to a lesion of both tracts. The post-mortem findings verified this.



Date, July 23, 1912.
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CASE II.

The tumor was found to be an osteosarcoma, evidently starting from the dorsum sellæ, extending somewhat backward, there originally pressing the sixth nerve against the tense anterior part of the pons. But the growth of the tumor was mainly forwards, replacing entirely the posterior lobe of the pituitary body and part of the anterior lobe.

Case II.—B. G., age 12 years, male. First examined April 4th, 1912. During the previous December the patient began to have "attacks." At first about two a week. The first symptom would be a twitching and turning of the eyes to the left. The attack could sometimes be averted by covering the eyes with the hands. Later the left arm began to twitch and draw, often to such an extent that the patient could only use the right hand to cover the eyes in an effort to stop the attack. If standing, the patient would occasionally fall, but not lose consciousness, according to the statement of the parent. Lately the attacks had become more frequent, sometimes four a day (attributed by the parents to too much eating of meat). Mentally good, disposition good; very little, if any, headache.

Ocular examination showed central vision normal in each eye (20/15, Green's test types). The ophthalmoscope gave nothing positive—the left disc possibly hyperæmic as compared to the right, veins somewhat larger, slightly more tortuous.

On covering the left eye, there occurred a marked turning of the eye outwards and upwards, the vertical axis rotating inwards. On examination of the fields of vision there was discovered a left homonymous hemianopsia to within ten degrees of the fixation point. (See Fig.) The lesion here is evidently situated in the right cortical area—the only explanation of the perfect preservation of the macular fibres in such a complete hemianopsia. The partial involvement of the left oculomotorius might be explained by the connection of the superior colliculus to the nucleus of the oculomotorius of the opposite side, as I mentioned above.

Case III.—C. P., age 28 years, male. Patient was examined March 17, 1911, perparatory to an injection of salvarsan. The eyes were found normal. In the latter part of August of the same year the patient became frightened on noticing a diminution of vision of the right eye, thinking the condition was due to the use of the salvarsan. When he reported on September 1st, a right sided homonymous hemianopsia was found, not complete, but affecting the central vision of the right eye to a slight extent. The condition was accompanied by severe headaches. A diagnosis of a basilar meningitis, affecting the left tract was made. Under intramuscular injections of mercury, the condition rapidly disappeared.

NOTES ON A CASE OF UNILATERAL BUPHTHALMOS, IN WHICH A POSITIVE WASSERMANN REACTION WAS OBTAINED.

By Samuel Horton Brown, M.D.
PHILADELPHIA, PA.

The patient in this case was a little Italian school girl, about eleven years of age, born in this country, and rather undeveloped physically, although her mental faculties were greatly in excess of what would be expected, considering her physical and ocular infirmities.

The right eye was normal except for a faint haze of the cornea and marginal blepharitis and its vision was 6/60 without glass, and the refraction showed high compound hyperopic astigmatism. The correcting lens brought it up to 6/30. The other media were clear and the fundus was negative.

The left eye showed pronounced enlargement of the eye in all of its diameters and the cornea was especially large. This eye also showed evidence of marginal blepharitis, chronic catarrhal conjunctivitis, maculæ corneæ, and congenital cataract. No view of the fundus was obtainable. The vision was scarcely more than light perception. Examination of the refraction was unsatisfactory, although the retinoscope showed reversal in the meridian of greatest refraction when a plus 4.25 was placed before the eye.

Examination of the blood in this case showed, hæmoglobin, 75 per cent.; red blood cells, 4,050.000; white blood cells, 10,000. The differential leucocyte count showed, polymorphonuclear, 80; small mononuclear, 18; large mononuclear, 2. The Wassermann test made by the Noguchi method was positive plus two.

The case is of interest largely because this is perhaps one of the earliest instances in which this condition, usually regarded as a sequence of congenital syphilis, has been scientifically demonstrated to be present in the course of the disease. Dr. Wm. Zentmayer, of Philadelphia, in a personal communication to the writer, has observed the condition of buphthalmos rather frequently in the colored race, more frequently than in the white race in fact, and leans to the opinion that the condition must be in some way related to syphilis, which is very common in its congenital form among negro children. Dr. P. N. K. Schwenk, also of Philadelphia, and of the Wills Hospital staff, states that most of the cases he has observed have been secondary to interstitial keratitis. He also observes that while the eye is large the refraction defect is usually hyperopic or compound hyperopic astigmatism, an observation which was confirmed in this case.

OPERATIVE MEASURES CAPABLE OF MODIFYING INTRA-OCULAR TENSION.

F. Lagrange (*Bulletin de Académie de Médecine,* June 4, 1912) finds, in reviewing recent international medical literature, that his operation of sclerectomy for the relief of glaucoma is being quite generally accepted. Lately he has been treating detachment of the retina by the reverse of this method, that is he aims to decrease the outflow of the intra-ocular fluids, in place of trying to increase this outflow as in the operation for glaucoma. He tries to do this by the production of fibrous tissue at the places where the transudation is likely to occur. He calls his method "colmatage," which is an agricultural term used to designate artificially raising the level and fertilizing low land. He has found the most effective and least harmful method of accomplishing this to be by galvanocauterizing, superficially, with a thin, flat blade, over the surface of the anterior part of the sclera, after making a circular equatorial incision of the conjunctiva and turning it back. In addition to this a 10 per cent. salt solution is injected sub-conjunctivally posteriorly. Thus the intra-ocular fluid is prevented from escaping through the sclera in front and behind and can only pass out along the optic nerve. This gradually brings about an increase of the tension of the eyeball and thus aids in getting the retina back to its place. Lagrange has used this method quite extensively during the past year and while the results have not been conclusive yet they have been very encouraging, the tension of the eyeball being raised in every case. Although this in itself is not sufficient to cure detachment of the retina, still it is of considerable assistance, and this treatment has brought about reattachment by itself in cases due to high myopia or after trauma. Where it is of inflammatory or congenital origin, blood-letting, mercurial inunctions and mercurial treatment in general should supplement the treatment, to assist in removing the cause which should always be sought.

WHO? HOW? WHEN?

By H. B. Young, A.M., M.D.,
BURLINGTON, IOWA.

If one reflects upon the plan to create the new degree, "Doctor of Ophthalmology", as tentatively endorsed by the Ophthalmic Section of the American Academy at the Niagara Falls meeting in August, or even that to establish a course which will designate its patrons more distinctively as surgeons, as approved at the recent New York meeting of the Clinical Congress of Surgeons, he is perhaps fortunate if he does not recall the late Artemus Ward's scheme for preventing incompetency and jealousy in his military company, viz: "No privates, every one to be enlisted as Brig. Gen'l." Not that there is any question about the desirability or necessity of better qualifications for those who will specialize, but rather a very large question of, WHO may properly be considered as teachers, HOW they will be selected, and WHEN will they be able to offer a real "quid pro quo"; not only these but WHO is to satisfy the public that these new titles mean more than the host of those gotten more easily, HOW is it to be done without the liberal use of "printer's ink", and WHEN are the holders of these titles to be more than beginners?

Nor is it to be denied that "surgery has suffered from the failures of the inefficient and illy prepared"; but WHO is to say to his young colleague, "This is too heavy a task for you," and WHEN and HOW shall he say it? The man with the third of a century's experience, plus a fair record for dilligence, knowledge, and success, will doubtless, on the average, render better service than the younger man, no matter how well grounded he may be; and the former may be, perhaps has been, at times sorely tempted to make some remarks to this effect. If, however, he has not forgotten his own early trials, and the uncertainty which must always attend the outcome in any serious undertaking, he can do so only at the price of violating that sense of the proprieties which his position should have developed. And then there is the inalienable right of the patient to decide according to his "lights" and his bank account.

Ridicule of medicine as a science, and more particularly its exponents, may be deserved so long as measures looking to *designated* differences between the qualified and the unqualified claim so much attention in medical gatherings. All hail to the extra courses of instruction; but down with the extra degrees! A doctor can be nothing greater than "Doctor"; and he should be nothing less, qualifications, conscience, and all. Moreover the lack of the "conscience and all" may not be balanced by extra qualifications, certainly not by extra degrees. The right sort of man will make headway without, as well as with, special titles, and his work is the measure of his standing.

Charlatanry has means of attracting business which it is best not to imitate.

GONORRHŒAL IRIDO-CYCLITIS, WITH OBSERVATIONS ON ITS RELATION TO SO-CALLED "RHEUMATIC IRITIS."

A. S. Cobbledick (*The Ophthalmoscope,* December, 1912), reports a number of cases of acute irido-cyclitis occurring in patients who had previously had one or more attacks of gonorrhœal urethritis and in all but one of whom the gonococci were found in the urethral discharge secured at the time of the ocular trouble. In concluding his paper he says: I am of opinion that the acute cases which in the past have been classed as "rheumatic" are mostly, if not all, gonorrhœal in origin, and that the gonococcus is by far the most common cause of *acute* irido-cyclitis. I admit that the gonococcus has never been found in the aqueous.

Byers, from his pathological examination of an eye suffering from gonorrhœal irido-cyclitis, concludes that the inflammation is the result of a toxin. If this is the case, it should be feasible to prevent recurrences by curing the discharge, and it is the ophthalmic surgeon's duty to urge on his patient the importance of special treatment for the urethral disease in order to lessen the possibility of recurrence of the eye trouble.

The presence of the gonococcus in the urethra and its diverticula is so constant in these cases of irido-cyclitis that it must be looked upon as the cause. It must also be admitted that in addition to the gonococcus there were present numerous staphylococci in most of the urinary deposits. I do not regard these as a likely cause of the *acute* eye condition; for in my experience, chronic septic processes chiefly produce a chronic irido-cyclitis, with much cellular deposit on the cornea.

MEDICAL SOCIETIES

OPHTHALMIC SECTION

St. Louis Medical Society.

November 6, 1912.

Dr. J. Green, Jr., in the Chair.

Case Report.—By Dr. W. E. Shahan.

This case, which I wish to mention briefly, is of special interest because of the removal of a piece of steel from one eye through the original wound by means of a small hand magnet. The patient came to our office November 4th, with a history of being struck in the right eye by a small chip of steel which flew off from a hammer he was using, four days previously. There was a clean cut about 4 mm. long in the upper nasal quadrant of the cornea and a corresponding cut, somewhat further nasalward, in the anterior capsule of the lens. The lens was clouded over the whole of the nasal half. The sideroscope gave positive reactions to a magnetic foreign body. The pupil was only half dilated and the foreign body was not visible by means of the ophthalmoscope. The next day, under full mydriasis, the foreign body was plainly visible, even with oblique illumination, suspended by fine threads in the vitreous behind the lower nasal quadrant of the lens. It responded so promptly to magnetic influence that it was thought advisable to try to draw it around the lens through the zonule of Zinn into the anterior chamber, somewhat after the method of Haab. The giant magnet was used without success. The hand magnet, with one of the shorter heavier points, was then used, the point being held at times directly against the sclera and cornea, as near the foreign body as possible. After some manipulation, the iris began to protrude at a point near where the foreign body was known to be. After some further manipulation, the point of the magnet being very near the original wound, but not touching it, there was a sudden gush of aqueous and the fragment of steel was found clinging to the point of the magnet. The eye has been perfectly quiet since.

DISCUSSION.

Dr. Carl Barck: In this connection I would like to report a case, which I saw about two weeks ago, and then put a question before this Society. The patient was a young man, about 20 years old. His right eye had been injured when he was a child and in consequence a traumatic cataract had developed. This cataract was needled by a confrére about five years ago with a good result as to vision. The eye was perfectly quiet, until a few days ago when he struck it with a piece of wood. Since then increasing inflammation.

When he came to me, I found in the anterior chamber, in front of the iris, a piece of capsule, about 2 mm. in diameter. It was situated at the bottom of the chamber in the erect position of the patient but easily movable. At one end of this piece of capsule and somewhat hidden by it, there was a small black spot or body. At first I took it for some iris pigment, but as it seemed rather large I placed the patient in front of the giant magnet. The magnet pulled it forward at once. This, of course, established the diagnosis that it was a piece of steel or iron. After a corneal section downward the piece was easily removed with the hand-magnet. It was much more difficult to remove the piece of capsule with the forceps, because it had become fixed in the lowest portion of the chamber. The recovery was uneventful.

We have here a case where a piece of steel had been tolerated by the eye for about fourteen years without any irritative or other symptoms. In all probability the piece had entered the lens and remained there until the physician needled the cataract. Afterwards it was probably in such a situation, held or surrounded by a portion of the capsule, that irritation was prevented. The recent injury dislodged it and then inflammatory symptoms set in.

The question I want to bring up is, What is the best method of procedure in cases where the foreign body entered through the sclera without injury to the lens? Haab of Zuerich recommends also in such instances to draw the piece with the giant magnet around the periphery of the lens and then through the pupil into the anterior chamber and remove it from there after a corneal section. This seems to me a dangerous procedure. It is of course possible to avoid injury to the lens during this maneuvre, as it has been done. But it was not certain that such injury can be prevented; the slightest unruliness of the patient will produce it. I believe that it is preferable in such instances to remove the piece through the sclera with the hand-magnet; either through the old wound, when the case is seen early enough, or by a new scleral incision. The danger of introducing instruments into the vitreous has in my opinion been overestimated. My personal experiences with the small magnet have been quite satisfactory.

Dr. Shahan, in closing: It has been best, according to the experience of our office, to make an incision through the sclera and draw out a magnetic foreign body with the point of a small magnet, as Dr. Barck has described. But this case seemed to be very favorable for the other method and it was therefore attempted with the above result.

A Case Report.—By Dr. John Green, Jr.

It is generally agreed among ophthalmologists that salvarsan has proved strikingly efficacious in many syphilitic ocular disorders, such as iritis, choroiditis, etc. Curious enough, interstitial keratitis occurring in subjects of hereditary syphilis, has seemed, as a rule, not to be favorably influenced. The writer has had occasion to investigate the literature bearing on this question and it appears that present ophthalmic opinion tends to a belief in the greater efficiency in this affection of mercury and the iodides. From this point of view the following case is of interest:

K. V., age 7, came to my service at the Children's Hospital, September 18, 1912. The mother stated that one month previously the right eye had become inflamed following a slight injury (finger thrust in eye). Two weeks later the left eye also became inflamed. He had been treated at a local eye clinic and the eyes had steadily grown worse. The boy presented a typical picture of a bilateral interstitial keratitis. Dr. T. C. Hempelmann, to whom the patient was referred for general examination, elicited the following additional facts: The patient was an only child; the mother had had no miscarriages. He was a full term infant and breast-fed for nine months. No diarrhœa or constipation in infancy. Father died of tuberculosis. Patient has had pertussis, measles, but no scarlet fever or diphtheria. Has been somewhat nervous since eyes became sore. Physical examination showed the heart and lungs normal, the spleen palpable, the liver not enlarged. The boy exhibited well marked scaphoid scapulæ, epitrochlear glands on both sides enlarged, the axillary, cervical and inguinal glands slightly enlarged. Wassermann strongly positive. The boy was first put on syrupus ferri iodati, twenty drops three times a day, with some improvement. On Oct. 11th .3 gram neosalvarsan was injected into the buttocks. There was prompt and striking improvement in the eyes so that by the 30th when he returned for a second injection of a .25 gram the photophobia had entirely disappeared, and the corneæ had notably cleared.

DISCUSSION.

Dr. Woodruff: This case I have to report is a case of a girl 11 or 12 years of age, giving and having given for a number of years all the marked symptoms of interstitial keratitis and hereditary lues. The child has been under treatment for eight years, two years with one physician, five years with another and a year ago last August she came to me. The child was given two injections of salvarsan. She had been troubled with a great deal of photophobia, so much that she was unable to look at a book or to use a pair of scissors, etc. Had had repeated acute exacerbations of the trouble. Since about October a year ago she has been going to school steadily, not missing a day and has made a steady progress and has grown physically very markedly. I had a Wassermann done on Monday of this week and have the report that the condition is still positive. I shall have an injection of neosalvarsan given her at once. This case to me was exceedingly interesting because I knew the character of the treatment she had had before she had the salvarsan. Her general health has improved greatly and she has developed and grown, I should say, two inches in this last year.

Dr. Shahan: The case to which Dr. Woodruff refers came under our care some years ago. She was under our care for five years and had been given from $^1/_{12}$ to $^1/_{24}$ of a grain of bichloride of mercury three times a day continuously. She was given two doses of salvarsan and I watched her through that period at the Skin and Cancer Hospital. The reaction was pretty severe. She had a great deal of pain, but almost immediate marked improvement in her symptoms was noted. When I last saw her the photophobia had about ceased.

Dr. Shoemaker: I should like to ask the members of the Section whether any of you have gotten good results from the use of dionin in the late stages of parenchymatous keratitis, when the inflammatory symptoms have subsided, but there still remains considerable opacity of the cornea?

Dr. Woodruff: In this case the cornea cleared very markedly, but I have been using in addition to general treatment a solution of dionin. Whether it was the salvarsan that did the work or the dionin is somewhat of a question.

Dr. Loeb: I wish to take exception to the last remark. I have had a case of distinct improvement in a clinical case of a bilateral interstitial keratitis under the use of dionin. When the patient came to me the pupil was contracted as far as I could make out. The opacity was so dense that hardly any of the pupil or iris could be seen. The acute process had entirely disappeared, very little injection remaining. I put the patient on internal treatment of hydrarg. cum creta and locally used atropin. After the pupil had been dilated sufficiently to get rid of any adhesions that were present, I put the patient on daily instillations of dionin. The cornea has cleared up, in one eye there is a slight opacity in the form of a minor scar and the other eye has a few scattering opacities. It was the dionin I feel convinced that cleared the eye. I have seen numerous cases improve under the use of this drug.

The Relationship of the Posterior Lens Capsule and the Vitreous.—By Dr. Carl Barck.

The general view maintained by advocates of "extraction within the capsule" that a perfectly clear pupillary area is obtained has not always proved true in the author's experience. In a number of instances a haziness or an opacity in the anterior layers of the vitreous was present. Similar observations have been reported by others. Investigations of the writings of such authorities as Morris, Piersol, Schwalbe, Salzmann, Greef, Parsons and others as to the presence or absence of a direct connection between the posterior capsule of the lens and the anterior layers of the vitreous revealed widely varying and sometimes directly contradictory views. If there is a direct and intimate connection, laceration of the anterior layers of the vitreous may be expected from removal of the lens in its capsule; if there is no connection or a loose one, clear pupillary areas may be expected. In order to decide this question practically the author cut away the cornea and iris and carefully covered the fibres of the zonule of Zinn from the eyes of oxen and rabbits, and found that when the eyes were held so that the lenses were down, the lenses did not fall freely from the patellar fossæ of their own weight but that considerable force was required to remove them. Also when the parts about the vitreous were cut away, and the vitreous held downward, the major part of the vitreous fell, but particles were always left adherent to the posterior surface of the lens. This, in the author's mind, at least in the case of these animals, proves that there is a distinct and fairly strong adhesion between the posterior lens capsule and the vitreous in the patellar fossa. Investigations of this same nature will be conducted later on human eyes.

DISCUSSION.

Dr. Shahan: Considering the problem from an embryologic standpoint, it is also quite probable that there is some connection between the anterior portion of the vitreous and the posterior surface of the lens. It is well known that during one period of embryonic development, the hyaloid artery ramifies in the vitreous and forms an intricate network on the posterior surface of the lens. And although this artery with it glial mantle, the central vitreous body of Retzius, disappears in late embryonic life, it is difficult to believe that it disappears so completely as to leave the lens and vitreous completely separated by perfectly clean surfaces. It is much more probable that there are fibrillar remains of these early structures extending from the posterior lens capsule into the vitreous so that when the lens is removed in its capsule these fibrils are uprooted with consequent laceration, and occasional clouding of the anterior surface of the vitreous. It is not at all unusual to see remains of the hyaloid artery on the posterior surface of adult lenses during routine ophthalmoscopic examinations.

Dr. J. Gross: I am not sure, but it may be of interest to you to know that Dr. Ewing has been devising forceps for cutting and removing the anterior lens capsule in the extraction of cataract. I think he has published some of these results in the AMERICAN JOURNAL OF OPHTHALMOLOGY. I have seen Dr. Ewing operate with these forceps in two or three cases and the results were very satisfactory. I suppose if you could pull out the entire lens capsule with any kind of a forceps without cutting it up it would be better still, but I have my doubts as to the possibility of that.

Dr. Shahan: With regard to the use of capsule forceps, I had the opportunity of seeing them frequently used in various parts of Europe and England. They appear to be quite universally used as a routine on the continent, but in London apparently not so freely. I was struck by the fact, which may have been accidental, of seeing more needle operations in a few days in London than I saw in several months on the continent.

Dr. Barck, in closing: I believe that if we would find a reliable method to remove the entire anterior capsule and lens, this method would be preferable to the extraction of the lens in the capsule, because less dangerous and because the vitreous is left intact.

As to the embryological question, brought up by Dr. Shahan, we know of course that the vitreous develops from the mesoderm and the lens from the ectoderm. But this has, in my opinion, little bearing on the practical side of the question. For in spite of development from different embryological layers, the two membranes may become afterwards so intimately united, as to become practically one. This happens in other parts of the human body.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

TRANSPLANTATION OF THE HUMAN CORNEA PREVIOUSLY PRESERVED IN AN ANTISEPTIC FLUID.

A. Magitot (*Jour. A. M. A.,* July 6, 1912), having successfully transplanted a corneal graft, taken from a lower animal and preserved a number of days in blood serum at a temperature slightly above 0 C., upon the eye of another animal of the same species, determined to try the operation upon a human eye. The opportunity presented itself in the case of a boy 14 years of age, who had a large cicatricial pterygium, the result of a burn from quick lime several years previous. With the exception of a small spot in the upper, inner quadrant the entire cornea was opaque and this spot was nebulous. Several days later a patient with absolute glaucoma in one eye desired to have the eye enucleated for the relief of pain. The cornea was opalescent and insensible, due to the extreme hypertension, but the enucleated globe was carefully placed in a hemolyzed blood-serum taken from a person in whom the Wassermann reaction was negative, after having been washed successfully in ten tubes containing Locke's solution at room temperature. Kept in the blood-serum in a sealed container-tube, the globe was placed in an ice-box at a temperature which was maintained at 5 C. At the end of twenty-four hours the cornea had become quite clear and was kept in this state for a week. After eight days, the pterygium being first carefully dissected away, a piece of the cornea 4 mm. high and 6 mm. long was carefully removed from the center of the opaque cornea, down to Descemet's membrane, but leaving this intact. To this prepared surface a piece of the same size and thickness from the preserved cornea was applied without suturing. When the binocular bandage was removed at the end of the third day the graft was found to be in perfect apposition and entirely transparent. Fluorescein did not stain at any point. Eight days afterward the red fundus reflex could easily be seen through the pupil. While the pterygium returned on the cornea it did not grow over the graft although it completely encircled the edges of the keratoplasty. Nearly a year after the operation was performed the graft is still perfectly transparent and the visual acuity is 1/7.

The author believes that the result was as good as if fresh material had been used and that for the first time a successful transplantation has been done by the aid of corneal tissue preserved for several days in a state of vitality. The success of his operation shows also that corneal grafts from eyes affected with absolute glaucoma may be used for this operation.

SUNLIGHT TREATMENT OF PRIMARY TUBERCULOSIS OF THE CONJUNCTIVA.

Rollier and G. Borel (*Revue Médicale de la Suisse Romande,* April, 1912) report a case of primary tuberculosis of the conjunctiva which was cured after three months' treatment by systematic exposures to direct sunlight. The patient was a medical student who had been infected by pus squirting into the eye as a tuberculous cavity was incised at a necropsy. The treatment was carried out by his everting the upper lid first and then the lower one and thus exposing them to the direct sunlight for a few minutes and afterward continuing the exposure through the closed lids. The exposures were lengthened until six of ten minutes each were given daily and this was supplemented by a local sun bath for a secondary cervical lymphadenitis. No disturbance of the circulation nor photophobia were produced by the treatment and the conjunctiva was left smooth and normal, which is not the case under other methods of treatment.

CORRESPONDENCE.

To the Editor: New York, December 30, 1912.

The visit by a party of German physicians to the recent International Congress on Hygiene and Demography has proven that a well managed Travel Study party of physicians can make a trip through a foreign country in a far more pleasant and profitable manner, and at less expense, than can be done by travelling alone. Clinics can be arranged in advance, lectures prepared and visits made to the best hospitals and health resorts, with the assurance of a hearty welcome from the leading medical men of the localities visited. For those unable to speak the languages of the countries on the Continent, this disadvantage is reduced to a minimum and the benefits of the trip correspondingly increased by travelling with such a party.

The incoming International Medical Congress, London, Aug. 6-12, 1913, gives a splendid opportunity for organizing an American Tour of this sort and plans are now ready for a Physicians' Travel Study Tour, leaving New York July 3rd for the most important capitals and health resorts on the European Continent: Paris, Munich, Carlsbad-Marienbad, Dresden, Berlin, Nauheim, Wiesbaden, Cologne, Brussels, the Hague, Amsterdam, etc., ending with the week of the Congress in London.

The plan of this tour has been seen and endorsed by Drs. A. Jacobi, T. C. Janeway, Ch. G. Kerley, O. G. T. Kiliani, L. R. Williams, Wisner R. Townsend and others. Physicians interested in such a trip should write for further and more detailed information to RICHARD KOVACS, M.D.,

236 East 69th Street, New York City.

XVIITH INTERNATIONAL CONGRESS OF MEDICINE,

London, August 6th to 12th, 1913.

We are asked by the Secretaries of the Section of Ophthalmology to recall to our readers the following Rules of Congress:

"The titles of all independent papers should be announced to the Central Office of the Congress by the 30th of April, 1913. Any papers offered after the 30th of April, 1913, will only be placed upon the agenda after the discussion of those which have been announced before this date and have been chosen by the Council of the Section. No paper will be accepted unless the title has been received by the Secretaries of the Section before the 1st of July, 1913. The text of every communication must be typewritten. Independent Papers may be written in English, French, German or Italian."

THE AMERICAN JOURNAL
OF
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ORIGINAL ARTICLES.

KERATOCONUS AND ECTOPIA LENTIS.*

REPORT OF A CASE PRESENTING BOTH CONDITIONS IN BOTH EYES.

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

Keratoconus and ectopia lentis are rare enough to make a case in which both conditions are present in the same person of sufficient interest to chronicle.

Mrs. E., aged 27, consulted me because of poor vision which made difficult her work, that of a stenographer. She stated that her vision had always been poor, as was that of her mother and a number of her relatives, one or two of whom had become practically blind. She could give no information as to the nature of the ocular trouble of either her mother or any of her relatives. The patient complained of no pain in her eyes or head but said she was unable to hold a good position on account of not seeing accurately and clearly. She had been wearing the same glasses the past ten years and had been told by an oculist whom she consulted recently that no improvement could be made on them. She was wearing O.D.+7.50 D. C. ax. 155; O.S.+11.50 D.C. ax. 15, and with these she could read 18/30—with the right eye and 18/96 with the left. The vision without glasses was: V. O.D.= 12/200; V. O.S.=2/200. She could read Jaeger No 1 at 2 inches with the right eye and at 1 inch with the left, without glasses. An attempt was made to measure the corneal astigmatism with the ophthalmometer but this could not be done on account of the great curvature. Whereas the shortest radius of curvature measured by my ophthalmometer is 6.8 mm., that in the meridian of least curvature of the patient's better eye appeared to be between one and two mm. less than this, while in the worse eye it seemed to be only about half as much as the lowest measurement of the instrument. The average radius of corneal curvature is about 7.8 mm.; that of my patient's right eye was, as nearly as I could guess, about 5.5 m.m., and that of the left eye 3.5 to 4 m.m. Inspection of the eyes showed the corneæ of both eyes markedly conical, that of the left eye being more so. Under homatropin cycloplegia the patient accepted: O.D.—7.00 D.S.⊃—6.00 D.C. ax. 180, giving her 18/30+vision, and O.S.—24.00 D.S.⊃—8.00 D.C. ax. 180, giving 18/96 vision. Ophthalmoscopic examination showed that in addition to the conical corneæ the crystalline lenses were displaced directly downward, leaving the upper part of the eyes, corresponding to a little less than half of the pupils, aphakic. Both lenses were perfectly clear, there being an absence of the dark ring that is generally found, corresponding to the edge of the lens. After the cycloplegia had passed off her refraction and vision appeared to be: V.O.D. w.—7.50 D.S.⊃—8.00 D.C. ax. 180=18/24—; V.O.S. w.—24. D.S.⊃—8.00 D.C. ax 180=18/96. With this correction she could read Jaeger No. 1 with either eye, up to 4 inches. Her orientation was very poor with them, however. Through the aphakic part of the eyes the following result was obtained: V.O.D. w.—1.50 D.S.⊃+8.00 D. C. ax. 155=18/19—; V.O.S. w.—3.00 D.S.⊃+8.00 D.C. ax. 15=18/75. With the plus cylinders alone she could read with the right eye 18/30+ and Jaeger No. 1 at 6 inches, and with the left eye 18/96+ and Jaeger No. 2. These were quite comfortable and, her orientation being good with them, they were prescribed. With the new lenses she seemed to get along better, doubtless due more to the proper adjustment of the lenses than to the change in their strength, the old ones being very badly out of adjustment. The patient did not complain of diplopia, which is common in cases of ectopia lentis, but did complain of things not being clear until she looked at them for an instant and also that frequently objects were not where they appeared to be at first, both conditions, doubtless, being caused by the dislocation of the lenses, there being too much difference in the refraction of the two different parts of the eye to produce distinct diplopia. The patient's vision in her right eye is remarkably good, considering the degree of conical cornea together with the dislocation of the lens. Her preference in the use of the aphakic part of the eye is in harmony with the general rule of patients having ectopia lentis.

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*Read at the Meeting of the St. Louis Ophthalmological Society, January 27, 1913.

My patient's ability to read ordinary print with her distance correction of the aphakic portion of the eye and even to read as fine print as Jaeger No. 1 at 6 inches distance with +1.50 D.S. added to her distance correction of the right eye, suggests some accommodative power of the aphakic eye. In an article published in the May, 1905, number of the AMERICAN JOURNAL OF OPHTHALMOLOGY, Dr. J. W. Charles discussed this subject and gave the views of numerous writers as to the manner in which this apparent accommodation is brought about. I do not know that anything more definite has been presented on the subject since then. Turning of the head and tilting of the lenses seemed to be excluded in my case. Judging from the information given by the patient and from the old glasses which she had been wearing for ten years, little or no change had taken place in her eyes during that period of time, and hence there was no demand for any interference for either condition, further than the careful adjustment of the proper lenses.

Concerning the ætiology of keratoconus, nothing definite seems to be established. It is known that there is a marked thinning of the cornea at and near the apex of the cone (Salzman finding the corneal thickness to be less than one-fifth of a millimeter in an eye examined microscopically by him) but what condition is responsible for this thinning is still unknown. Some constitutional dyscrasia is generally believed to be present, although there are records of cases occurring in perfectly healthy country girls in whom no constitutional cause could be found. Fox states that the condition is found most frequently among Mongolians, especially in Chinese. Pagenstecher's observations incline him to the theory that there is a congenital disposition toward conical cornea. Salzman, Tweedy, and others hold the same view, while Wicherkiewicz contends that it is not always so. Increased intraocular tension is believed by some to be a causative factor, but others and perhaps the majority of observers believe that when such increase of tension is present it is an incident resulting from the keratoconus rather than the cause of that condition. Conical cornea generally has its beginning at puberty and is found more frequently among females than males; for this reason the weakening of the cornea which allows it to become stretched and thinned is believed by some to be due to nutritional changes brought about by the nervous phenomena incident to puberty.

Bradfield emphasizes the fact that it is only in the early stages of the disease, before the cornea has become too markedly conical, that treatment other than operative will accomplish any good. Hence early diagnosis is important. The ophthalmometer is of the greatest aid to us in detecting these cases in their early stages, as not only is astigmatism always present but the meridians of least and greatest curvation are not at right angles to each other. This instrument is also of great assistance in watching the progress of the condition, showing clearly, not only whether the astigmatism is increasing or decreasing, but also whether the curvature of the cornea in all its meridians is increasing or decreasing. For this reason it is wise always to note the radius of curvature and make record of it. Placido's disk is of much value, too, in detecting the early stages of keratoconus. As a rule the refraction of eyes with conical cornea is myopic. There are exceptions to this, however. Wuerdemann, several years ago, reported a case of double conical corneæ where the refraction under homatropin was: O.D.—2.00 D.S.⊃+7.00 D.C. ax. 75; O.S.+11.00 D.S.=+5.00 D.C. ax. 15, having 6/12 vision with either eye. This report called forth the reports, by different observers, of a number of other cases in which conical cornea was present with hypermetropic refraction.

That proper treatment is of great benefit when instituted early, before the cornea has been too much stretched, seems demonstrated by numerous reports. Hotz reports a case of double conical cornea in which the refraction of one eye changed in about two years from—2.00 D.S.⊃—3.00 D.C. ax. 180 to +5.00 D.C. ax. 180, with improvement of the vision from 20/70 to 20/30 and disappearance of the cone. Bradfield says treatment should begin by correcting any errors in the general health, following good hygienic principles, rest of the eyes from all use requiring prolonged accommodation, and correction of errors of refraction by appropriate lenses. Great care should be exercised in correcting the errors of refraction as there is often a high degree of astigmatism present, the correction of which improves the vision very materially. One writer reports a case accepting —17.00 D.S.⊃+32.00 D.C. ax. 10 and with this correction had 20/20 vision and was entirely comfortable. It is only in the early stages of the disease that much success can be hoped for in reducing the ectasia. When the cornea has been greatly stretched and thinned for some time it cannot be restored to anything like normal, and often the astigmatism is so irregular that the vision is very poor and cannot be improved much with any glass. In such cases operative measures are to be thought of. These may be either the excision of the apex of the cone, suturing the edges of the corneal wound together or the use of the thermo-cautery by which it is hoped to secure a flattening of the cone through the contraction of the tissue as the wounds heal. There appears to be a difference of opinion as to whether it is wise to perforate the cornea with the cautery or whether Descemet's membrane should be left intact. It would seem preferable not to perforate the cornea with the cautery and to do paracentesis in the healthy corneal tissue, thus avoiding the danger of infection of the intraocular tissues, and at the same time giving the wound an opportunity to heal without bulging, by keeping the intraocular tension low by frequently doing a paracentesis. Some very good results have been reported as being secured by both the excision and cautery methods.

Congenital dislocation of the lens is generally supposed to be due to a faulty development of the zonule of Zinn by which the support of the lens is weakened or entirely absent in certain parts, allowing it to be drawn away from that part toward a position where the suspensory ligament is more developed. Parsons, in "The Pathology of the Eye", says: "The condition has been attributed to fluidity of the vitreous, failure of the suspensory ligament, etc., (v. Graefe, Quaglino). The frequency of displacement upwards suggests some relationship to the closure of the secondary optic vesicle, and this view is supported by observations on cases in which the hyaloid artery persists and the vitreous undergoes atypical development (Hess, Treacher Collins). In the latter condition fibrous bands are formed in the lower part of the vitreous in relation with the foetal cleft; these not only displace the lens upwards, but may also pull it backwards. They are formed very early in fœtal life, so that it is not improbable that they may entirely disappear before birth, the displacement of the lens alone remaining (Hess). Samelsohn's conjecture, that the lens invaginates the primary optic vesicle at an abnormal situation, is not supported by these observations, and would probably lead to much more extensive anomalies." The most usual direction for displacement of the lens is upwards, and generally the two lenses are displaced in the same direction. My case is rather unsual in that both lenses were displaced downward.

As to treatment, where vision is not too greatly impaired, it is best to be content with as accurate a correction of the error of refraction as possible. In certain cases a carefully done iridectomy may secure better vision. In children or young adults discission may bring about the absorption of the lens and enable the patient to see better with the proper glass. David McKeown suggests the advisability of needling the lens for the purpose of making it opaque and thus relieving the monocular diplopia. It is to be feared that cosmetic considerations would make at least some patients dissatisfied after such a procedure had been followed. Only in exceptional cases is an operation for the extraction of a congenitally dislocated lens to be considered, as the difficulties to be overcome in such an operation are great and the chances of undue loss of vitreous should make even a bold operator hesitate.

SUCCESSFUL TREATMENT OF GONORRHŒAL CHORIOIDITIS BY VACCINES.

George W. Vandergrift (*Jour. A. M. A.,* June 8, 1912) reports a case of metastatic gonorrhœal chorioiditis which recovered under vaccine treatment. When first seen by the author the vision of the right eye had fallen to 10/200, while that of the left eye was 20/20. The vitreous of the right eye was heavily clouded with opacities. After these had cleared sufficiently the optic nerve was found to be normal, but a yellowish mass could be seen in the lower nasal quadrant of the choroid, projecting into the vitreous. He gave a negative history as to syphilis, tuberculosis and rheumatism and tests for the first two named diseases were negative. He gave a history of having had three attacks of gonorrhœal urethritis, however, the first ten years ago, the second six years ago and the third one year ago. The complement fixation test for gonorrhœal infection was strongly positive. Accordingly he was treated with mixed vaccines (gonococci and staphylococci). After three injections, at several days intervals, massage of the prostate, which previously had shown large numbers of gonococci, now showed none. After several weeks treatment the vitreous began clearing and in about three months' time the exudate was entirely absorbed and the vision of the affected eye was 20/20. No other treatment than the vaccines was employed except the use of atropin locally.

EXTRAORDINARY ALTERATIONS IN THE CORNEAL EPITHELIUM OF A GLAUCOMATOUS EYE.

By Adolf Alt, M.D.,
ST. LOUIS, MO.

The eyeball presenting the alterations in the corneal epithelium which in the following are described, I owe to the kindness of Dr. M. Wiener. All of the history I could obtain was that the patient had come to the office of Dr. Wolfner with a glaucomatous attack in an eye previously blinded by glaucoma, and that this eye was removed a few hours later by Dr. Wolfner. In view of the interesting findings it is particularly unfortunate that the history of the case is so meager.

There was a deep old glaucomatous excavation and all the other well known pathological conditions of glaucoma, which, however, besides a recent infiltration of the whole uveal tract and of the optic nerve, presented nothing of especial interest.

Before I embedded the eye for section cutting, I was struck by the peculiar appearance of the cornea. A milky looking thickening was noticeable on its surface, reaching from the corneoscleral margin toward its centre in the upper half of the eyeball, which I thought was a pannus. In the lower half the surface of the cornea appeared quite irregular.

On section the pannus-like thickening of the upper half proved to be made up of dense connective tissue, containing a number of bloodvessels near Bowman's layer, on which this newly formed tissue rested. The tissue thus interposed between epithelium and Bowman's layer at the periphery has the thickness of half the cornea, and grows thinner toward the centre of the cornea where it ends somewhat abruptly.

In the absence of any history, it seems quite impossible from the sections alone to explain this peculiar connective tissue growth. It is not like what we find in spring catarrh, neither is it similar to an atrophic pterygium. It appears, however, not unlikely that it is a strangely thick and fibrous pannus—unless, perhaps, the connective tissue has grown into the cavity of a very large epithelial vesicle.

This view receives some strength by the conditions found in the lower half of the cornea.

Here what little of the conjunctiva has remained at the periphery of the cornea is very much infiltrated with leucocytes, with some plasma cells between them. Near the periphery the corneal epithelium is slightly lifted up from Bowman's membrane in several minute places by small amounts of round cells and a very thin layer of connective tissue cells. Somewhat farther toward the centre there is a vesicle the anterior wall of which is formed by the stretched corneal epithelium, the posterior wall by Bowman's layer, which appears perfectly intact (See Fig. 1). In this vesicle no fluid contents can any longer be made out, but there is a thin connective tissue membrane which is folded up in such a manner that it may before sectioning have, perhaps, lined the inner surface of the vesicle.

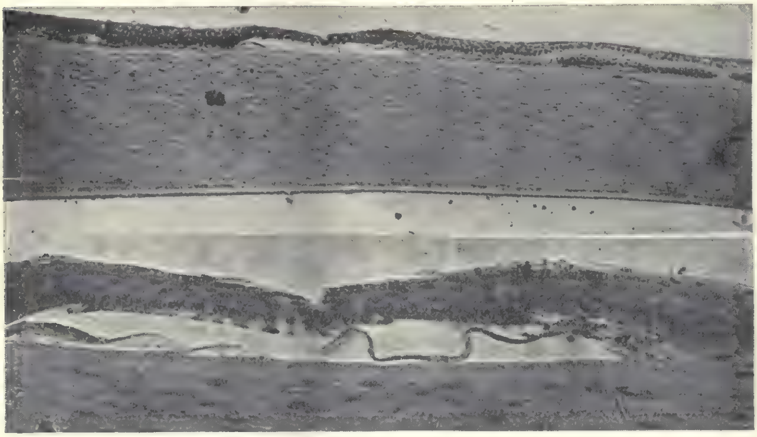

Fig. 1.

At the central periphery of the vesicle this membrane is in direct continuation with an appreciable amount of connective tissue which is at first situated between epithelium and Bowman's membrane. A little further on this small amount of connective tissue is, together with the surface epithelium, lifted up and separated from Bowman's layer by several layers of epithelial cells. Thus there are in this part two distinct and separate covers of epithelium lying on the intact Bowman's layer, and divided from each other by a small amount of connective tissue. Further inward the inner epithelial cover is broken up into pieces which in the sections appear very much like the pegs of an epithelioma. In this part the substance which separates the cell nests is rather homogeneous and contains but few connective tissue cells, which lie just upon Bowman's layer. Still further inward there is a ruptured vesicle, the anterior wall of which is lost. (See Fig. 2.)

Like Bowman's layer, the parenchyma of the cornea appears unaltered throughout.

Vesicular formations on the cornea are observed in the course of a facial herpes, and are usually called keratitis vesicularis, although there is no proof of any inflammatory condition being present in the corneal parenchyma. Larger vesicles, so-called bullæ, are especially formed in the corneal epithelium of eyes otherwise diseased, especially in the corneal epithelium of glaucomatous eyes. Under the assumption of a definite keratitis this condition is called keratitis bullosa. The cornea of the eye here described shows no evidence whatever of a keratitis. In this eye the affection had for its field of operation the epithelium only, unless we can assume that the high intraocular pressure forced fluid through the corneal parenchyma and Bowman's layer under the epithelium, which with an absolutely intact endothelium on Descemet's membrane is certainly not probable.

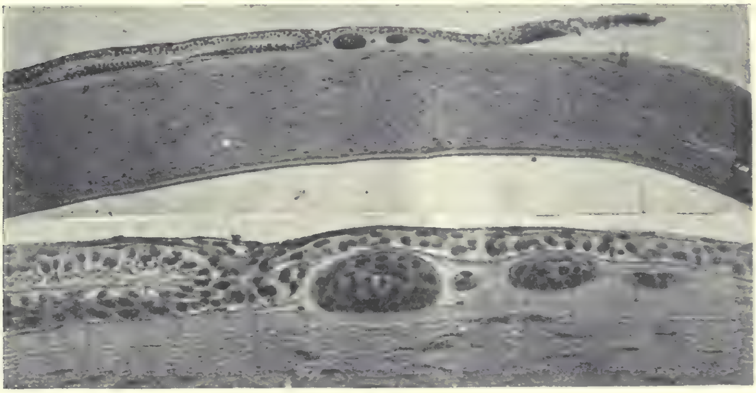

FIG. 2.

While a small amount of connective tissue in such corneal vesicles has previously been found by Fuchs, Collins and others, a condition of the corneal epithelium as found in this eye and probably due to a peculiar cicatrization following the formation of corneal vesicles has, as far as I know, not been encountered thus far.

THE THIOCYANATES IN THE BODY FLUIDS.

By Bernard R. LeRoy, M.D.,
ATHENS, OHIO.

The first action of the thiocyanates in the body fluids is the simple one of chemical solvent. This action takes place in the saliva during mastication and digestion. The gelatinous and mineral substances of the food are thus acted upon and rendered more soluble and assimilable. Without this action certain necessary food elements cannot enter the system in the essential physiological form. Without the thiocyanates in proper physiological amounts in the body fluids, certain essential constituents are caused to be continually precipitated somewhere within the body, while others are excreted in abnormal amounts, as for instance, the precipitation of calcium, magnesium and silicon in union with the fatty acids and gelatinous substances in cataracts, opacities and scar-tissue in the eye, and such systemic diseases as arteriosclerosis, chronic syphilis, chronic insanities and other chronic conditions where the cells have been filled with a deposit of these substances from a slight clouding to a deep solid infiltration. This produces a changed cellular action which may be any condition from a slightly changed physiology to a complete cessation of function. In the second instance, I call attention to the large amount of calcium and magnesium that is to be found in the urine of those suffering from chronic forms of pulmonary tuberculosis and other chronic conditions. In all these chronic conditions the thiocyanates are found in greatly reduced amounts or *more often found to be absent.* The more chronic the condition the more certain I am to find the body fluids absolutely free from the thiocyanates.

I must repeat, with growing emphasis, the statements made in former articles published in the Journal and elsewhere, in regard to the physiological and the therapeutical uses of these salts in the body fluids.

I wish to speak further of the physiological use of the thiocyanates in the body fluids. If one wishes to enjoy life and to be free from many serious chronic forms of disease the thiocyanates must be present in the body fluids in amounts equal to that found in the body fluids of a young, healthy, rapidly growing girl of sixteen years. This is the standard which I have found to give the best returns in the afflicted, and also the standard which I have found to be near Nature's requirements, after examining many thousand people, young and old, sick and well, and of all colors and nationalities. This I found also to be the standard in every person of greatly advanced age whose body fluids I have examined for the thiocyanates. In these cases the thiocyanates were always found to be present in large amounts equalling that found in a vigorously healthy girl. In cases of extreme old age, it is often quoted that tobacco and the alcoholics were active agents in promoting longevity! This is most absurd! These poisons, I have found are very active in reducing the amount of the thiocyanates in the body fluids, and in all those cases referred to, the simple truth of this matter is, that in spite of the poisons the vigorous, active body of the person produces an unusual amount of the thiocyanates. And in all cases the healthy, vigorous action of the *glandular system* is to be noted. The thiocyanates are produced by the glands of the mouth from certain radicles or molecules derived from certain vegetables, as follows: garlic, leeks, onions, horseradish, mustards, radishes, turnips, that is the skins of young tender ones, and all allied vegetables.

This matter has been carefully studied for a space of many years, and the results of the experiments repeatedly noted in examinations of the blood and body fluids.

I have also found that in all cases of heredity examined, and they were many, the thiocyanates played a very important part, always being absent in both parents, as well as in the children. This fact is deserving of the most exacting academic study.

The total absence of the thiocyanates in the body fluids of all cases of chronic forms of disease, especially where there has been a continual drain upon the body fluids, is in itself very significant, and extremely suggestive. I know of only two exceptions in chronic diseases, in certain heart diseases of the aged, and in all cases of tumor or where there is a rapid proliferation of cellular elements, that is, where there is a rapidly growing abnormal growth of any description; in these cases the thiocyanates are found in excessive amounts in the body fluids. When the thiocyanates are absent from the saliva, they are not to be found in any of the body fluids. Conversely, when they are present in the saliva they are to be found in all the body fluids.

For the past five years I have been pursuing with increasing care the study of the thiocyanates in the normal, as well as in the diseased human being, and I have learned that when these powerful acting poisons are administered to the chronic invalid after the plan which I have so often mentioned, there is absolutely no danger to the patient. In using the thiocyanates as remedial agents, one must ever keep in mind that to effect a cure it is of vital importance to observe the *requisite physiological time*. We of this day and age of rapid, strenuous, pit-pat methods of living and of doing business do not care to take up with anything which may require *time* to perform; oh no! We want that which is instantaneous in effect, never stopping to think that it requires twenty-four hours to make a day; three hundred sixty-five days to make a year. As the Creator required time to create all things, especially the Human Being, I have learned that He designed such a thing as *Physiological Time* for changes to take place in the human body. It no less requires time for the cell to become clouded with deposits or precipitation of the combinations of the earthy minerals with fatty acids and gelatinous substances, thus producing the initial step in much of our pathology. It also requires time for conditions to pass from this initial stage to where the cell has become packed with this deposit, changing the cell action and thus its physiology. In all chronic diseased conditions the cells have passed through all varieties of this change, the resulting changed physiology we are wont to recognize as various symptoms and stages of disease. Now, I have learned that this continuous retrograde movement from healthful life, through changing physiology, to complete stagnation in the cell or organ *may be reversed in action* by the proper administration of the thiocyanates after the plan suggested in my published articles. The precipitation is checked. The deposit is resolved and removed from the cell, and as this process takes place the primitive action of the cell is resumed again, and the physiology of that cell returns tawards the normal as the cell clears! This statement no doubt sounds extreme; but I think it reasonable, so I will go farther,—I will add to it another startling announcement of equal import. It is this: After the clouded, opaque and "dead" cells have been given the suggested form of treatment, and after the grosser deposits have been dissolved and removed from the once disabled cells or organs, there remains absolutely no evidence, neither scar nor other defect, that may give an examiner the faintest clue concerning the character of the original diseased condition!

I am in a position to offer satisfying proof, which, I am sure will substantiate every statement I have made in my published articles on the subject. For the past five years I have been pursuing this study in my private practice, and I have had several hundred patients take my form of treatment.

Case 1.—Male, 32, a miner by occupation. During some trouble at the mines he was hit in the right eye with a chunk of slate. The eyeball was cut in a diagonal direction from above outwards and downwards, on the inner aspect of the eye, just involving the pupillary edge of the iris, then continued downward through the sclerotic portion to a distance below the iris. See the illustrations. He at once bound the eye up in its own blood and in due time when the wound was healed he discovered that he was nearly blind, and within the following six months he lost completely the vision of that eye. The eyeball was covered with a thick yellowish-white scar tissue, and the ball was turned towards the right and was immovable. He came to me on September 20, 1910, nearly three years after the accident. At that time the eye presented the appearance as shown in cut No. 1. The scar tissue was of a dark, dirty yellowish color and the fixed position of the eyeball gave him quite a startling appearance. Because of this, I was consulted as to the removal of the eye and the proper substitution of an artificial one. He could not see any reflection or shadow when looking at the sun, even when an object passed between it and his eye, but, upon testing the eye with the high frequency current, placing the electrode on the eye, he could distinguish considerable difference in the field of vision. I at once told him of the treatment with the thiocyanates, and promised him some degree of vision if not complete restoration of his normal sight. He stood and laughed at me, saying that he had been to see noted specialists in Columbus, Cincinnati, and elsewhere, and that all these men had told him the same thing, that is to have the eye removed lest he should also lose the sight in the other eye. Upon promising him that we would operate upon the slightest indication of trouble in the left eye, we gained consent to try the treatment for six months. In six weeks he reported being able to see an increasing ray of light which appeared at a right angle to the face, about forty-five degrees upward, that is at a point where the closed fist would be if one should elevate his arm at right angle to the body, the fist elevated above the shoulder and on a line with the face. This ability to perceive light increased steadily and as the light grew in volume it passed forwards and downwards toward the normal plane of vision. This queer fact is true of all cases of blindness resulting from either traumatism or cataract that are under my treatment. After the third month the eye commenced to work in unison with its mate, and soon thereafter resumed its normal motion. In six months the scar-tissue or infiltration covering the corneal surface, was nearly all resolved and removed. The dirty yellowish color changed to a pure white, then to a bluish white, then to a very delicate tint of pale blue, and then faded away, not unlike a piece of clear hard frozen ice melting in the presence of a gentle degree of heat. (See No. 2.) The broad scar appeared with much prominence, while it and the traumatic cataract were of a yellowish color, and the former seemed to resolve more quickly at the upper end than anywhere else. As the scar disappeared the cellular structures of the eye exhibited no trace of the injury. The eye becoming clear and normal, the *iris resuming its normal action* as it became free from the scar-tissue. Nor can one detect any remains of the scar-tissue! Here I wish to say that in all my cases under treatment for blindness, as soon as vision returns so that the patient can distinguish small objects, the individual seems to lose power to judge aright as to whether or not he may or may not be improving, that is he cannot judge as to the degree of improvement at any time during the treatment. Therefore, accurate visual test examination must be made from time to time.

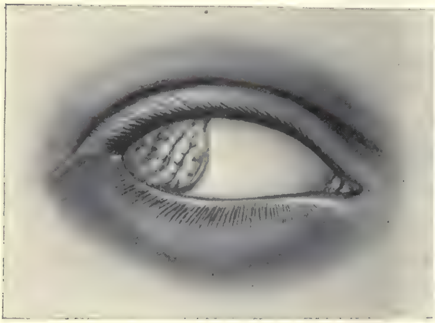

Fig. 1.

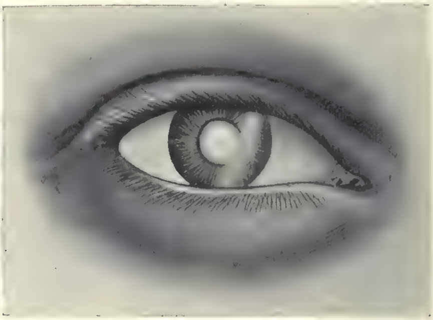

Fig. 2.

After twelve months treatment No. 3 was taken. The patient could read the headlines on newspapers or any large print. He could distinguish friends at a distance of fifty feet. The iris cleared at the upper end of the scar, and where it was free from the deposit the iris appear to be perfectly normal in looks and in action. The lens was clearing from without inwards and gave the decided appearance of the edge of a small piece of ice. The deep yellowish color of the central portion of the lens changed towards the outer edge, to a white, then a pale bluish white, then to a transparent ice-like substance, through which he could see with ease. This disappearance of the cataractous substance in the lens was more rapid from the outer upper edge than it was from the inner lower edge. The patient was and has remained in the best of health and at no time did he take medicines or drugs of any kind, other than the treatment outlined in my articles on the thiocyanates.

As the end of the eighteenth month of treatment, No. 4 was drawn by the artist. Now the appearance of the eye had changed considerable, the scar had been resolved nearly one-half, the upper portion looked like a faint milky streak, and the portion of the iris held in bond by the scar seemed to buckle up in its endeavors to free itself. The scar throughout its entire length was growing smaller and smaller at the same time that it became white in color, then bluish-white and then a pale blue color just as did the cataract. In fact they passed in successive stages through the same color changes. Now the cataract had become triangular in appearance and was of a pure white color in the densest part but, towards the edge could be seen the thin ice-like transparent portion with its thin sharp edge, and as I have said he could see through this part with ease. He could read any large print and did so with impunity, and without any harm whatever.

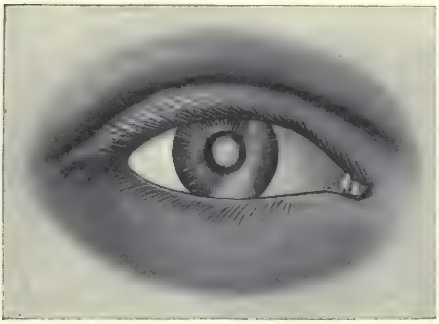
FIG. 3.

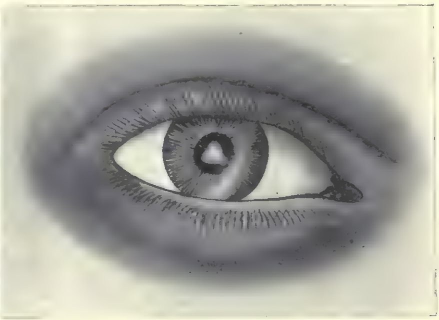
FIG. 4.

Near the end of the second year of treatment the artist drew

No. 5. The scar tissue had nearly disappeared and the iris was acting in an imperfect manner. The cataract had changed its shape and while yet triangular in form the angles had shifted their position. The color of the cataract was now a pale blue. The patient could see through the denser part and distinguished very large objects.

The treatment continued as outlined in my preliminary articles, and on April 1, 1912, I had the artist draw picture No. 6. The scar tissue had almost vanished. The iris, where it became free from the binding interference of the scar tissue, acted in a perfectly natural manner, and where it was still involved in the scar, the tiny muscles buckled up in quite a comical manner in endeavors to get free. This movement of the iris was in itself slight and had to be examined closely to detect it. The precipitation in the lens became almost resolved. The shape of the lens had changed to a small triangular shaped dot which lay about midway between the center of the pupil and the lower edge of the iris when the latter was dilated. This dilating was performed in an irregular manner, the upper and outer portions reacting naturally, but the inner lower section of the iris was prevented from moving by the scar. Upon examining the eye with the ophthalmoscope I found that the cataract had become resolved in the greater part, but there remained a portion shaped like a dumbbell. The outer end of this dumbbell was fastened to the anterior capsule on a plane with the edge of the iris below the pupil. The other end was fastened to the posterior capsule at a place above the pupil, so that the patient was able to get vision between these two portions, and further, the *handle* of the thing was very thin and faintly outlined in shape. The

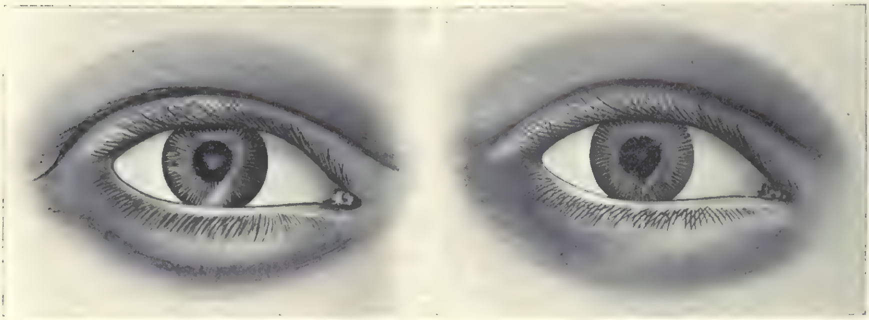

FIG. 5. FIG. 6.

color of this portion was clear like pure hard frozen ice and offered no obstruction to his vision.

This man is still under treatment, and I shall, from time to time report to the readers of the JOURNAL any further progress he makes.

Case 2.—Final report of a case previously published. Child, aged 7, was infected at birth producing *ophthalmia neonatorum.*

After much trouble the physician saved the sight of the left eye, but lost totally the sight in the right one. The child was two years old when brought to me for treatment. At that time the right eye was covered with a dirty yellowish looking scar. This scar covered nearly the whole of the front aspect of the eyeball, and was what is popularly called a "chalk-eye". I had a photograph taken of him at the time treatment began, but from it I learned that photographs do not show up the details.

I tested for vision in this eye in every way possible and became convinced that he could not see even the rays from the noon-day sun, nor from the high frequency current. After results confirmed me in this belief. The child was in almost perfect health, judging outward appearances, yet I failed to demonstrate the presence of the thiocyanates in the blood or in any of the body fluids. I gave him a 1.1000 aqueous solution of the sodium thiocyanate. One teaspoonful in water after each meal. By analyzing the body fluids frequently, and by increasing the strength of the solution I caused the thiocyanates to appear in his blood in a slight degree above that which is normal in a young, healthy, rapidly growing girl of sixteen years of age. I endeavored to keep the content of the salt in the blood at this amount. The results of this treatment encouraged me to administer also a collyrium of the same strength as the internal medication. At no time did he complain of smarting or pain. This treatment was continued for three years in a spasmodic manner. In fact so irregular was the treatment that I despaired of obtaining good results; yet, the most excellent results were obtained. I am informed by his mother that he has recovered completely the use of the eye; that there is no trace of the scar tissue and that she had had the eye tested and failed to discover any defect. This I readily believe, for when I examined the boy last, the scar tissue had been resolved and removed, and the remaining opacity was nearly cleared.

Case 3.—Male, 65. In railway service. Came to me after being examined by the Company's oculist. He said that he was told that he had a cataract in both eyes, and that he would be forced to resign his position. He was also informed that he would be forced to wait until the cataracts were ripe before he could be given much relief. Being a poor man, the thoughts of losing his position troubled him greatly.

I found that he was afflicted with nuclear cataracts. He at once commenced treatment as outlined in Case No. 2, and in eighteen months thereafter he was again examined by the Company's oculist. He failed to demonstrate any sign of cataracts. The doctor seemed puzzled, and told the patient that the cataracts would return again in a few months and that he would be forced to watch him. After two years the man is still free from any signs of cataract.

Case 4.—Woman, 68, senile cataracts of the laminated variety. The spokes of the cataracts were causing the patient much trouble by interference with her vision. She being a dressmaker and obliged to work for her living was very anxious indeed. She was placed upon the same form of treatment, and within a year she ceased to complain of the interference of vision and now after nearly two years treatment there are but slight remains of the cataracts. Her eyes were becoming clear, bright and youthful in appearance, the latter due no doubt to the fact that her eyes are of a deeper color than before treatment.

Case 5.—Woman, 36, had trouble with her eyes for many years. When she first presented herself to me she was an object to be pitied. Thin, scrawny, and almost totally blind, she was led into my office by her little child. Her eyes were both practically in the same condition, that is, both were dry as an old scab, covered with the dry remains of an old chronic inflammation; the eyes had the appearance of dead fish eyes. The opacities gave the eyes a dirty leaden color, which appeared in places through the dry dirty yellow of the scar tissue. The lids were deeply inflamed and inverted so that the short eye-lashes were ever scraping against the eyeballs. All structures in both eyes were as dry as punk, producing a very unpleasant object to look upon. The pain and misery which this woman must have suffered is beyond calculation. She had visited many specialists, had spent much money, but had received the same results from all, her money gone and conditions gradually growing worse. She had but little faith in medical men, and hinted that if she failed to receive help this time, that life would not be worth living. My examination was painstaking and exhaustive. I was careful and endeavored not to blunder, and while I gave encouragement I was cautious in what I said to her. Her history was free from specific taint. She had had the pink-eye and from this her trouble dated when about fifteen years of age.

The body fluids failed to show the least trace of the thiocyanate. No evidence of any other trouble or disease than that of her eyes. She was given the same form of treatment as described. The collyrium contained 1/10 grain of pilocarpine hydrochlorid to eight ounces of the wash, and enough NaCl to make a normal salt solution in addition to the sodium thiocyanate to make a 1.1000 aqueous solution. She was to use the wash four times a day or oftener if necessary to give her ease and comfort. Internally she was given a 1.1000 aqueous solution, as in the other cases, one teaspoonful in water after each meal. Results: In four weeks she reported (she lives at a distance) that her eyes became moist and continued so to be, after the first five days. At the end of the second month she presented herself at my office. Her eyes were naturally moist, causing a vast change in the appearance of her condition. She had been diligent in removing the eye-lashes as directed, and had used the wash every two hours. I found that the thiocyanates were in the body fluids in a very faint degree, so I greatly increased the amount of these salts in both wash and internal medication. In four weeks she appeared at my office and I certainly was greatly pleased at the improved condition in which I found her. I was obliged to increase the strength of each solution, owing to the fact that her blood-pressure still remained high and that the reaction of the thiocyanates in her body fluids was not up to the standard which I have found to give the best results therapeutically. She could see well enough so that she attended to her own household work, and was able to get around without a guide!

So far I have given only cases where the blood-pressure was above the normal, and where the simple exhibition in the blood of the patient of the required amount of the thiocyanates caused a lowering of the blood-pressure and the resolving of the precipitation and deposits of the gelatinous combination of the earthy salts with the fatty acids, which I have found is the substance which clouds and clogs the cells. All these cases with high blood-pressure are very easy and simple to handle. A cure is effected in every case! But, in many similar cases where we may have a low or sub-normal blood-pressure this form of treatment will cause the most alarming symptoms if not death! Here I bring into play the known functions of the duct-less glands, producing even more brilliant results in many of the so-called incurable diseased conditions. In none of the cases reported have I given any other drug or medicine unless stated. It is imperative to have the teeth in perfect order, and to instruct the patient how and why mastication of his food should be well done. The faithful following of these two mandates by the patient, usually removes one of the many troublesome conditions, that *of constipation,* we have to meet in these cases. Otherwise I depend entirely, as stated above, on the action of the thiocyanates in the body fluids.

IS THERE TOXIC ACTION OF NEOSALVARSAN ON THE PAPILLO-MUSCULAR BUNDLE?

Gebb (*Medizinische Klinik,* September 1, 1912) reviews the arguments of those authors who aver that the irritation of certain cranial nerves after injection of salvarsan is due to its neurotropic action; he maintains that it is due to the syphilitic virus. This relapse of the infection after salvarsan injection Ehrlich calls *Neurorezidiv.* Salvarsan is much better than mercury iodide treatment since the latter influenced the syphilitic lesions in his patients in a less degree than the salvarsan, which brought about restitutio ad integrum in a few weeks. In a number of his patients the diseased papillomuscular bundle was rapidly influenced for the better. If salvarsan were toxic for this nerve, as Cohen asserts, then the author reasons that in his own cases where this bundle of nerves was involved much more damaging results would have to be expected. The opposite result was obtained. The irritated papillomuscular bundle was soon well and sight returned to the normal in a short time. Therefore there can be no injury to the nerve elements of the eye by salvarsan, and the hyperemia of the nerve sheath of the optic nerve or retinal hæmorrhages or central scotoma after salvarsan injections are merely the *neurorezidivs* of Ehrlich. Since Ehrlich's preparations do not cause injury to the eye, he was justified in speaking of the harmlessness of the preparations.—*N. Y. Med. Jour.*

MEDICAL SOCIETIES

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

December 12, 1912.

Dr. Wendell Reber in the Chair.

Altitudinal Hemianopsia, Unilateral and Bilateral.—Dr. Luther C. Peter.

Dr. Peter reported two cases which were in some ways unique:

One of unilateral altitudinal hemianopsia, due to embolism of the inferior artery of the retina; in a 30 year old married woman with characteristic history of embolism, Pupils equal, react to light, accommodation, and consensually; eyes steady under cover. Wernicke's phænomenon is incomplete. All external ocular muscle movements good.

Fields in right eye somewhat contracted, especially for form. In the left eye there is some slight contraction for form and color in the inferior half, with total blindness above, running horizontally above the center. Heart and renal conditions are normal. Patient's general build is frail, and she reports that at time of visual failure her health was not up to par.

The restoration of the upper half of the retina was due in all probability to the anatomic arrangement of the vessels and the location of the embolus, thus allowing the blood to pass gradually into the superior vessels, while the inferior branches remained closed. The macular region was not included in the blind area.

The other case was one of binocular superior hemianopsia occurring in a 41 year old married woman.

As to the location of the lesion the facts in the case pointed to the inferior surface of the chiasm. Bilateral superior hemianopsia followed promptly by atrophy of the inferior half of the optic nerves must necessarily be in or about the optic chiasm. The sudden appearance, also atrophy of the optic nerve following the development of the hemianopsia, points to a lesion well forward, either in the chiasm or anterior to the chiasm. Anæsthesia of the left face, arm and hand at the time of onset, suggests a disturbance well back in the tracts near the peduncles, or primary optic centers. As the patient was profoundly neurasthenic it may have been but another phase of her functional disturbance when she discovered the blindness in her upper fields. If organic in origin, it is not difficult to conceive a gummatous basal meningitis involving the chiasm and extending back towards the peduncles or the primary optic centers.

A comparative study of the fundus changes in these cases is interesting in contrast. The changes in the disc and retina of the unilateral case are entirely nutritional in origin. The dividing line is well marked in the disc, and even in the size of the vessel, the inferior arteries being little more than one half the size of the superior vessels. This is in marked contrast to the second case, which furnishes a picture of post-neuritic atrophy. The pallor in one-half the nerve head is common to both cases, but in the latter the disc is not clear, the edges being veiled and the porous opticus invisible, while the arteries and veins are fairly uniform throughout.

DISCUSSION.

Dr. Posey recalled that loss in the field of a hemianopic type sometimes results from vascular changes in the nerve itself or from pressure of atheromatous vessels upon the nerve. He said that of course no pure chiasmal lesion could occasion a complete loss of vision in the whole of the upper fields of both eyes, as the nasal halves would necessarily be uninvolved. To explain a loss such as had occurred in Dr. Peter's case, it was necessary to look for a lesion either anterior or posterior to the chiasm. He referred at some length to the loss in the upper fields of vision following chiasmal disease and to the value of x-ray study in determining the nature of the lesion. Even vague shadows obtained from radiographs should be regarded as positive findings. Operation by the method recently devised by Frazier gave more promise of relief than earlier procedures.

Dr. Zentmayer said loss of one-half of the field of vision due either to retinal changes or to optic atrophy is not unusual. "I recall a case of obstruction to the central artery of the retina in which recovery of the superior half of the field occurred rather late. Similar defects are found to be quite common in amblyopia resulting from general hæmorrhages. I have elsewhere reported an interesting case of so-called inferior hemianopsia.

Following long continued attacks of temporary obscuration the inferior field finally became permanently blind. The upper half of the optic nerve is atrophic. The superior half of the opposite eye is now having repeated attacks of obscuration. The cause here is probably arteriosclerosis of the ophthalmic artery producing pressure upon the nerve at the point of entrance into the orbit.

It would be better not to use the term hemianopsia in such cases especially where there are similar defects in the two eyes, and this term should be limited to symmetrical half field blindness due to a central lesion."

Reflex Symptoms Resulting From Low Degree of Muscle Imbalance.—Dr. Leighton F. Appleman.

Dr. Appleman's communication had to do with hyperphoria only.

Patients often show only a shade of vertical deviation with the Maddox rod for distance, but if the test includes an estimation of the muscle status at the reading distance, an error of 1 to 2 or more degrees may become manifest. If then a prism of ¼ or ½ of the strength found be placed before the eye, together with the Maddox rod, and the patient be directed to gaze on the light, he will often show a perfect balance. In other words he is suffering from latent hyperphoria, which is just as potent in causing reflex symptoms as is latent hyperopia and astigmatism. As in hyperopia and astigmatism, it is often the small error of ½ or ¾ of a degree which prevents an otherwise perfect result from the use of glasses.

Of a series of 181 cases prescribed for during the last 15 months, 64 were given correction for hyperphoria, and of these, only 13 were given a prism of over 1 degree, leaving a balance of 51 who showed hyperphoria of less than 1 degree. All these patients expressed a distinct sense of relief, as though a strain were taken off the eyes when the prism was put on over their correction, and subsequent reports have shown continued relief from their symptoms.

The conclusions to which I have come, as a result of the study of these cases, is: (1) That many persons suffer for years with headaches and reflex symptoms for which they have been drugged, and their glasses changed many times, without attention to the muscle balance, and therefore without the relief which should attend their use. (2) That patients suffer from latent hyperphoria just as much as from latent hyperopia and astigmatism. (3) That the recognition and correction of low degrees of vertical imbalance, in addition to their refractive error, is of the utmost importance to the comfort of the patient.

DISCUSSION.

Dr. Zentmayer: Whether or not to order prisms in low vertical errors before finding out whether the correction of the refractive error alone will not do away with the symptoms of which the patient complains must be decided by one's own experience. Dr. Appleman speaks of the change in the refraction in his cases as having been insufficient to produce the symptoms of which the patient complained and that therefore the small vertical muscular anomaly was taken into consideration. I do not believe it possible to determine whether or not the change in the refraction was the cause without first having made the necessary change in the glass. We all know it is often the smallest errors that produce the most pronounced symptoms. My own practice has been and is to ignore hyperphorias under 2½ degrees in first ordering glasses. I have rarely ever had to incorporate a prism because the correction of the refraction error failed to relieve the symptoms. I believe that I have not ordered prisms for errors of this degree in ten cases in 25 years of practice. I attribute this to doing the refraction work under complete cycloplegia induced by atropin and ordering the glasses while the effects of the drug was still active. Of course higher degrees may require correction and tenotomy is a very suitable means of treating such cases. I think that in rare instances the hyperopia increases after partial correction with prisms. I believe these cases to be due to congenital palsies with contractures which perhaps relax after prisms have been worn for a time. I have removed far more prisms than I have ever put on.

Dr. Posey said that several years ago he had made a clinical study of 287 cases of hyperphoria and had found that when properly searched for, hyperphoria of 1 degree or more will be found to exist in about 13 per cent. of all cases of refraction. Latent hyperphoria is of frequent occurrence and develops quite independently of age. He had found that the correction of errors of refraction is not sufficient in the majority of cases to bring about a disappearance of any existing hyperphoria, as he had observed that hyperphoria makes itself manifest the longer the glasses are worn, the increase in the hyperphoria occurring whether the vertical prisms have been incorporated into the formula or not. While he was somewhat sceptical regarding some of the reflexes which eyestrain was supposed to originate, it had been his experience that the hyperphoria frequently gives rise to headache, that of the supraorbital variety predominating. In a small proportion of cases, it will be unilateral, usually on the same side as the eye with the poorest vision. Typical attacks of migraine may be expected in about 5 per cent. of all cases of hyperphoria. A symptom of frequent occurrence and of great value in directing attention to the hyperphoria consists in an associated reflex in the supply of the facial nerve. This may manifest itself either in a unilateral twitching of the lids, as in nictitation, or more rarely by a pronounced blepharospasm.

He decried the use of prisms in all cases, prescribing them only when they seemed particularly indicated, and then only partially correcting the error. He would not, however, like to practice ophthalmology without the use of prisms.

Dr. Peter's experience was that the vertical prism was of great use in properly selected cases when the refractive correction had proved insufficient and there was no general disorder to account for the residual symptoms.

Dr. Sweet: "I don't use a great many prisms and I never use prisms base in or base out, but I do use prisms base up and base down. I never give a prism at the first test, I always watch them until they wear their glasses for a while. If I find they have 1 degree of hyperphoria I always give them a 1 degree prism."

Dr. Reber: "At a first examination I think it is rather foolhardy to rush in with vertical prisms. Other things being equal I think it is the part of wisdom to give the patient a full chance with the refractive correction; but where there is a hyperphoria of 1½ degrees to 2 degrees that is producing symptoms when good refraction has been unavailing, I would give them half of their infinity correction. I think it is a mistake to give them the full correction at once; if there is a total of 2 degrees I should not give them more than 1, and there is no question but that the average person who puts on prisms will later show a greater hyperphoria than when prisms were first put on. My own case is a beautiful illustration. I had no trouble in showing 1, 1½, then 2 and finally 2½ degrees of hyperphoria. I have reached, I think, my full degree of hyperphoria, and have now worn the same vertical prism (2½ degrees) for 9 years. I think there is nothing truer than the existence of latent hyperphoria. I myself have seen many cases that show at first but ½ degree, and have shown as much as 1½ to 2½ degrees in 10 minutes by uncovering tests to break up fusion. If that is not latent hyperphoria, what is it? As to unequal hyperphoria in the two eyes, certain patients will show higher hyperphoria in one eye than the other, which I believe indicates some slight degree of paresis of the superior rectus in the hyperphoric eye. There is no end to the reflexes that may be set up by hyperphoria, the commonest ones being probably the gastric ones."

D. Forest Harbridge, M.D.,
Secretary.

EDITORIAL NOTICE.

We wish to draw the attention of our readers to the forthcoming *American Enclyclopedia of Ophthalmology,* which is being edited by Dr. Casey A. Wood. Associated with him are a large number of collaborators. It is Dr. Wood's intention to produce a work which will supersede anything of a similar scope published heretofore, a complete ophthalmic library in itself, in about ten volumes. The Cleveland Press, Ogden Avenue and Lincoln Street, Chicago, Ill., solicits an early subscription. The price of each volume will be $5.00, $6.00 or $7.50, according to the binding. The first volume is to appear early in May.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
St. Louis, Mo.

THE PRESENT STATUS OF THE CATARACT OPERATION.

(*Part I. Ætiology.*)

S. D. Risley (*Penn. Med. Jour.*, November, 1912) takes up the ætiology of senile cataract in Part I. of his paper on this subject, and shows "that the present status of the operation for the removal of the opaque lens must rest largely upon the result of this inquiry; that is, upon our views as to ætiology." He calls attention to the impression given by most writers of text-books of ophthalmology that senile cataract is one of the unavoidable incidents occurring in old age. All authors recognize what are known as "complicated cataracts" as being caused by iritis, iridocyclitis, choroiditis, etc., and also agree in attributing to diabetes and other systemic affections an important part in the production of cataract, but the cause of the ordinary senile cataract, occurring in "healthy persons and in otherwise healthy eyes" is unexplained by them.

The difficulty, if not impossibility, in the early stages of a cataract, while the fundus and vitreous can still be studied, to differentiate, by ophthalmoscopic examination, between a cataract due to diabetes or some other systemic condition and one that occurs in a person not having any such disease, convinces the author that there is not so much difference in them nor in the causes producing them. It is well known that the healthful nutrition of practically all the tissues of the eye is largely dependent upon the vascular choroid; but none of them suffers more in diseases of the choroid than the avascular parts,—the vitreous, lens and cornea. Thus the nutrition of the lens is very likely to suffer in diseases of the uvea. "While this clinical association is so obvious in the vast majority of cataracts, even in old people, the explanation of how the nutritional change in the lens is accomplished is by no means clear. Since the nutrient pabulum in health is secured by imbibition, it is probable that the colloidal supply from an inflamed tissue, as in uveitis from any cause, is so changed in chemical and physical character that it can no longer pass through the capsule or the suspensory system of the lens as in health." From his years of careful observation of local conditions in cases suffering with cataract and also close study of systemic states associated therewith, Risley has "come to regard every study of choroidal and retinal disease, whether associated with opacity of the lens or not, as incomplete which does not include also a study of systemic conditions. Cardiovascular disease, auto-intoxication and specific infections are common ætiologic factors in the choroidoretinal disease of which the lens opacity is a sequel. This reasoning finds corroboration in the fact that cataract is essentially an affection of advanced years. It occurs at a time of life when wear and tear is manifested in protean forms—faulty metabolism, a sclerotic vascular tree, nephritis, impaired digestion, auto-toxemia and high blood pressure; a time of life when the results of overwork, harassments, faulty and vicious habits and hereditary trends begin to show their ravishments upon the organism in the form of dyscrasias. The uveal tract of the eye seems especially prone to participation in these functional misfortunes. As sequels to this participation we have certain forms of glaucoma, iritis, degeneration of the vitreous, opacity of the lens. It is only in this sense that cataract is to be regarded as a concomitant of old age." "The modern status of the cataract, operation therefore rests upon our recognition of the essentially pathologic character of the affection; that it occurs not because the individual is old but because of local disease which, in a large percentage of the cases, is a sequel of some general dyscrasia."

READING A BOOK-PAGE INSTANTANEOUSLY: A CASE OF UNIQUE VISUAL POWER.

George M. Gould (*Jour. A. M. A.*, July 6, 1912) reports the case of a man who could read a page of an ordinary book at a glance. By fixing the gaze on the center of the page, the whole page at once came into view, was seen clearly and fixed distinctly in his memory so that he could recall it at will. He could thus read instantly page after page of a book, reviewing several books in an evening, and was able to pick out at a glance what to his mind were the essential points or sentences in a page. Nor did he appreciate the fact that he was doing anything unusual, but tried to convince his associates that they could do the same thing.

Gould says he was a man of exceptional learning, having a highly trained mind and an almost faultless memory. These things were essential for him to do what he did, and yet many a person might have these and it still be an optical impossibility for them to see all that was on a page to recognize it. In the case reported the man had sometime during middle life lost the central vision of his right, *dominant,* eye by an attack of central chorioiditis. The persistent effort of this eye still to continue its function, Gould believes, educated and trained the cells of the retina surrounding the macula so that they could accurately perceive and transmit to the brain all that was on a page except that part which should have been seen by the macula. The image of the left eye being exactly superimposed upon that of the right eye, supplied the macular defect so that the entire page was seen clearly. That it is possible for the retina surrounding the macular region thus to become more acutely sensitized, is proven, the author thinks, by the well known fact that a new macula is often formed at some distance from the true macula when the latter has been destroyed. He believes it impossible for any person with normal maculæ in both eyes to have "such a marvelous extension of synchronous and perfect peripheral vision as was illustrated in this case. That is possible only when one macula is destroyed, with retention of the perfect peripheral portions."

STRABISMUS IN CHILDREN.

E. A. Heimann (*Archiv. für Kinderheilkunde,* May 11, 1912) says that it is possible to correct squint without an operation only when treatment is begun when the squint first develops. Hence the importance of testing the eyes under atropin as soon as convergent squint is noticed, and full correcting lenses should be worn constantly. Exercises with the amblyoscope may be used when the child is three or four years of age and kept up for several weeks. He advocates operating as early as the fifth year if the other means fail to correct the squint to within at least 15 degrees, or if vision of the one eye is imperfect. Divergent squint almost invariably requires an operation, although the author has succeeded in correcting one case of incipient outward squint in four weeks by the use of amblyoscope exercises and correcting lenses.

ENDONASAL TREATMENT OF EYE DISEASES.

P. Stenger (*Therapie der Gegenwart,* June, 1912) refers to the growing appreciation of the relationship between nasal and ocular diseases and the benefit that may be obtained in certain diseases of the eyes by appropriate treatment of the nasal or accessory sinus conditions. Acute inflammation in the orbit, in the lacrimal canal, glaucoma, cataract and optic neuritis may all be secondary to some nasal disturbance. He gives examples of how failing vision may rapidly be restored in ethmoidal sinusitis by treatment of this condition. He believes that incipient glaucoma might frequently be helped by proper treatment of the nose as he has found some pathologic condition of the corresponding side of the nose in every case of glaucoma he has examined.

BOOK REVIEWS.

THE PITUITARY BODY AND ITS DISORDERS. Clinical states produced by disorders of the hypophysis cerebri. By Harvey Cushing, M.D. 319 illustrations. Philadelphia and London: J. B. Lippincot Co.

The medical profession owes a debt of gratitude to the brilliant author of this book, in which he has recorded the results of his carefully conducted researches in this interesting and important field.

The clinical part of the book is preceded by chapters on the anatomy, physiology and chemistry of the pituitary gland, which are excellent and convincing in their arguments based on experiments on animals. Yet, the chief interest of the book lies in its clinical part in which the author's experiences with disturbances of the function of the pituitary body and the often brilliant results of their surgical treatment are detailed. The ophthalmologist is especially interested in these on account of the ophthalmoscopic symptoms and the alterations of the visual fields encountered in such cases. Print and illustrations are as excellent as the text of this pre-eminently valuable book.

LEHRRUCH DER AUGENHEILKUNDE. (Text-book of Ophthalmology.) Edited by Theodor Axenfeld (with 11 collaborators). Third edition, with 12 plates, 3 colored plates and 554 illustrations in the text. Jena: Gustav Fischer, 1912. Price 15 marks.

Axenfeld's Text-book of Ophthalmology is before us in the third edition, and although it seemed hardly possible to improve on its predecessor, this edition is still somewhat in advance of the second one.

In view of the excellency of this text-book it is to be hoped that it may before long be translated into the English language so as to bring it to the direct knowledge of a larger number of ophthalmologists and students.

ELECTRICITY IN DISEASES OF THE EYE, EAR, NOSE AND THROAT. By W. Franklin Coleman. Toronto, Canada: The Courier-Herald Press. 1912.

The author of this exhaustive treatise on the application of electricity in its different forms in diseases of the eye, ear, nose and throat has at different occasions before this broken a lance for this, as he thinks, neglected part of therapeutics. His enthusiasm, evidently based on careful study, is certainly admirable, even if we cannot agree with him in every part. What makes this book particularly valuable is the record of a large amount of earnest research work of a conscientious scholar. Therefore, much good may undoubtedly come from its perusal by the practitioners in the special branches to whom it is addressed and also by the general practitioner.

There is no doubt that we have a powerful remedy in electricity and that its scientific application may be of value when other modes of treatment seem to fail. It is, however, not generally known that electricity can with benefit be used in the treatment of almost all pathological conditions, and that is probably where the author's enthusiasm leads him astray.

DIE SEHSCHAERFE DES MENSCHEN UND IHRE PRUEFUNG. (The visual acuity of man and its tests.) A physiologic-ophthalmologic study. By Dr. Leopold Loehner. Leipzig and Wien: Franz Deuticke. 1912.

In this book the author has laid down the results of careful and intrinsic studies concerning the visual acuity and the tests best adapted to get its correct measure. He comes to the conclusion that double dots are the best test object. The numerous experiments and their convincing results must be read in the original to be fully appreciated.

DIE ANOMALIEN DER SKLERALSPANNUNG. (The anomalies of scleral tension.) By Dr. Hugo Stransky. Volume I: Glaucoma inflammatorium; The aged eye; The scars of the sclera; Glaucoma simplex (first part). Leipzig and Wien: Franz Deuticke. 1912.

The author of this very interesting treatise, the first part of which has thus far only reached us, is satisfied that the tension of the sclera has not been given the consideration which it deserves, in his opinion, in the explanation of simple glaucoma, as well as some other affections. He adduces an enormous amount of material in order to prove his contention, and in the reviewer's opinion he has admirably succeeded. We await the coming continuation of his work with the firm conviction that he has increased and will still further increase our knowledge of the pathology of this hitherto so poorly explained affection.

ALT.

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ORIGINAL ARTICLES.

ON TUBERCULOSIS OF THE EYELID.*

By Harry Friedenwald, M.D.,
BALTIMORE, MD.

One of the distinct advances in ophthalmology that has been made in recent years has been the recognition of the importance which tuberculosis plays in disease of the different parts of the visual organ. Tuberculosis of the eyelids, however, has received but slight consideration in English and American ophthalmic literature. Parsons in 1904 (Pathology of the Eye, Vol. I. Part 1, p. 6) discusses the subject in a few lines under the head of "Lupus," though he gives an excellent account of tuberculosis of the conjunctiva. Recent American text-books follow the same lines. As a result we do not consider tuberculosis as an ætiologic factor when small areas of infiltration or ulceration of the eyelids are met with unless there is a clearly marked appearance of lupus.

The German and French handbooks make a clinical distinction between the various forms of lid tuberculosis. Terson in the Encyclopédie Francaise d'Ophtalmologie (1096, Vol. 5, p. 422) distinguishes "two chief varieties, tuberculous ulcerations, granulation-vegetation and abscess on the one hand,—and lupus on the other." Under the head of tuberculosis proper lesions are described which are rarely primary and usually spread from neighboring regions. It is necessary to differentiate tuberculous lesions from abscess, chalazion, syphilis and actinomycosis.

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*Read before the Ophthalmological Section of the Medical and Chirurgical Faculty, December 18, 1912, at which time Case 2 was demonstrated.

A fuller account is found in the second edition of Graefe-Saemisch's Handbuch, Vol. 5, pt. 2, p. 94, from the pen of Michel. He adopts on the whole the division of skin tuberculosis laid down by Mracek.

1. Lupus (presenting yellowish gray or brownish red nodules from the size of a pin head to a hempseed).
2. Scrophuloderma (in which the lesion usually begins in the lymph glands or lymph vessels, i.e., "cold abscess").
3. True tuberculous ulcer (the miliary tuberculosis of the skin).
4. Tuberculous warts,* and
5. Tuberculous fistula.

Infection may be metastatic, but is commonly direct; may attack those otherwise free from tuberculosis or may be self-infected. He finds that tuberculous ulceration is rarely primary and describes it as follows: "There are at first slightly raised tubercles or milium-like formations, which rapidly break down and become ulcerative, at which time they are easily mistaken for chalazion. The floor of the superficial ulcer is coated with soft yellowish-red granulations, the margins are sharply cut, jagged, very congested and but slightly infiltrated. In the immediate neighborhood fresh tubercles may develop. . . . . . The margin of the lid is the part most liable to the affection, especially the median portion of the lower lid. The destructive process along the margin of the lid may become very extensive. The disease may spread to the conjunctiva but it rarely spreads far over the surface of the lid. . . . It may spread to the opposite part of the other lid. The preauricular glands become somewhat enlarged. . . ."

Case 1.—Mr. J.E.N.S., age about 60, from Virginia, consulted me August 6, 1910, because of a circumscribed inflammation involving the inner half of the right lower lid, from which he had suffered for some time. I found the margin of the lid thickened and inflamed and somewhat ulcerated, and the skin and conjunctival surfaces rough, looking much like an inflamed chalazion. (See Fig. 1.) Yellow oxide of mercury ointment was ordered. I saw him at intervals of several weeks and found that it did not improve under this treatment. It assumed more and more the appearance of an incipient epithelioma and it was because of this suspicion that I advised the use of the X-ray treatment at the hands of Dr. Cotton. Preliminary to this, I removed a small mass from the inner surface of the lid and received the following report from Dr. Standish McCleary:

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*Michel places this class under the head of Lupus and introduces "Solitary tubercle with calcareous degeneration."

"This tissue mass, a little larger than a pin head, is covered with epithelium for a short distance at one margin. The rest of the surface shows ulcer with a granulating base. In the tissue are seen at least half a dozen tubercles. The intervening tissue consists of a fibrous stroma rich in cells. There is evidence of fibroid change in the tubercles and typical giant cells are seen there. In this specimen no attempt was made to demonstrate the presence of tubercle bacilli by special staining."

The patient showed no evidence of tuberculosis elsewhere and was otherwise quite well. There was no enlargement of the preauricular glands. The X-ray treatment was given in all about six times with varying intervals, medium vacuum tubes being used; the exposures lasted 8 to 10 minutes and the distance from the tube was 10 to 12 inches. The applications were discontinued when marked reaction occurred.

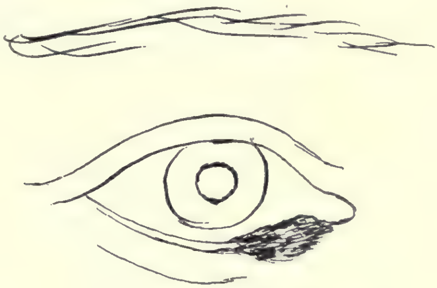

Fig. 1.—J. E. N. S., August 6, 1910.

During the course of this treatment a number of pustules appeared which were opened and touched with formaldehyde. The improvement was slow but ended in complete recovery.

Case 2.—Miss R. O., aged 13, was brought to my office August 13, 1910, while I was on a summer vacation and was seen by my assistant. The child had suffered from severe ophthalmia neonatorum. When she was a child of 5 or 6 there had been tearing of the left eye and the canaliculus had been slit completely. The right eye had been inflamed for a couple of months; the left eye for four days. There was marked photophobia and lacrimation, with clouding of the cornea; but there was no staining after instilling fluorescine solution. The diagnosis was interstitial keratitis. There was no evidence of inherited lues. The mother had borne eight children of whom the patient was the third oldest. The fifth child had died as an infant and the seventh birth was premature, the infant dying. The teeth are well formed. There is no history of tuberculosis in the family. Under iodide treatment and under local treatment of atropia and later dionin, the cornea cleared up and the patient's vision improved so that she was discharged from treatment as cured in the spring of 1911. In December, 1911, she returned and showed a circumscribed inflamed and swollen area around the inner canthus of the left eye. (See Fig. 2.) On inquiry it was learned that this had been present for three months. The inflamed area embraced the canaliculus which had been slit years before. The swollen area was smooth, showed no granulations or other irregularities, nor was there any evidence of ulceration. The line of demarcation was not sharp. On the conjunctival surface the redness and swelling extended a slight distance, but here, too, there was no evidence of ulceration. Excepting for its peculiar location and its being limited to a small part of the lid, it had all the appearance of a chronic blepharitis with marked thickening. Iodide of potash was given; the yellow oxide of mercury and ammoniated mercury ointment were used without showing any influence on the disease. In October, 1912, a piece of tissue from the skin surface was removed and the cut surface sutured. The excised piece was examined by Dr. McCleary. At the same time Dr. Cotton was requested to apply the X-ray treatment. He made similar applications as in Case 1, but used an aluminium screen for protection. After about twelve treatments, made twice weekly, marked reaction set in and the applications were discontinued. In the meantime the swelling and infiltration disappeared, and at the present time the area formerly affected shows only slight

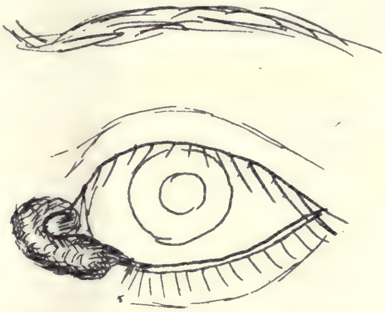

FIG. 2.—Miss R. O., December 3, 1911.

congestion.* The pathologic report of Dr. McCleary is as follows:

"There is no ulceration present in this growth, the surface being covered with sound epithelium. In the tissue numerous tubercles are to be seen, some of which are typical throughout, while in others lymphoid cells predominate over the epitheloid elements. Giant cells are frequent. Around some of the tubercles a fibrous wall has been built up. There is little tendency to caseation. Efforts to demonstrate tubercle bacilli were ineffectual. In as much as bacilli are in so scant numbers in these tissues, this is not surprising. Diagnosis: Tuberculosis of skin."

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*This has disappeared completely.

A CONVENIENT FORM OF THE HAITZ STEREOSCOPIC CHART FOR THE INVESTIGATION OF CENTRAL SCOTOMA.

By J. W. Charles, M.D.,
ST. LOUIS, MO.

In the October, 1904, number of the *Klinische Monatsblætter fuer Augenheilkunde,* Haitz described a new method of charting the limits of central scotomata by means of the stereoscope. This method is based upon the fixing ability of the other eye and the natural inclination to binocular vision, its great advantage being that if the fusion sense of the patient is at all developed, the examined eye will fix much more accurately than under the old method of examination with the other eye covered. As Haitz expressed it, "This is especially true when there is a very small central scotoma. Every experienced ophthalmologist can recall

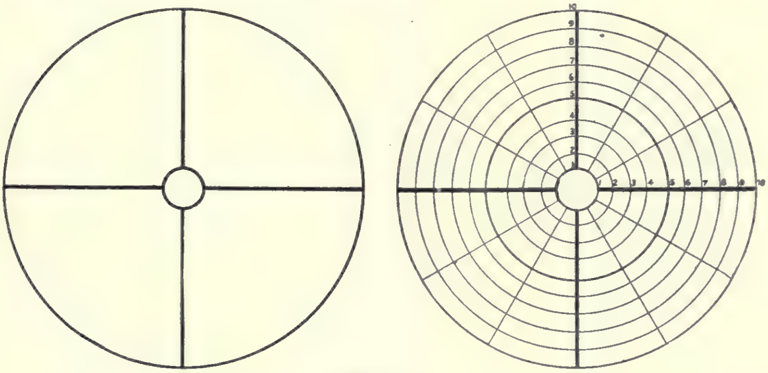


Fig. 1.

the difficulties in getting the patient to keep his eye constantly looking at the center of the arc in ordinary perimetry. This method of course requires central vision and fixing ability in the good eye. One would not think of using this method in a case of double macular disturbance."

Wishing to use a chart which would more nearly correspond to our record- and perimetry-cards, and which would not require a waste of time in copying from his charts to a more permanent form, I have drawn the following to be used with any cheap American stereoscope, as advised by Haitz, using his formula $\frac{MO}{LO}$=tan MLO. If the value of the lens is 5D, its focal distance LO=20cm. Therefore MO (the radius of the degree-circles on the chart)=20×tan MLO. For the values of tan MLO from 1° up to 10° we consult the table of natural tangents and find that the following values result, the value of MO depending entirely upon the focal distance of the lens LO: Since

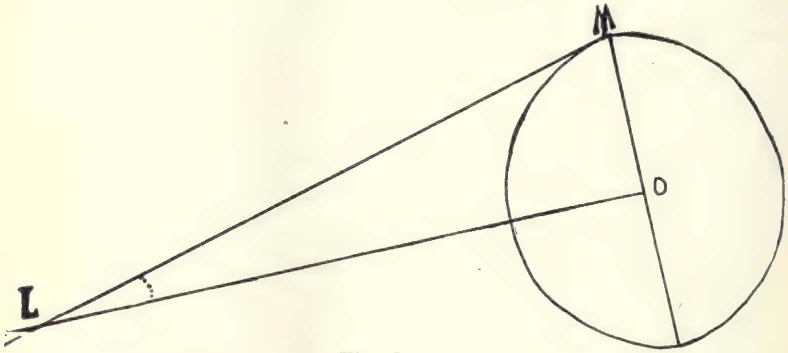


Fig. 2.

In the figure, MOM represents any of the degree-circles on the stereoscopic chart (with MO as radius) placed in the focal plane of the lens situated at L.

LO=focal distance of the lens. $\frac{MO}{LO}$=tan MLO.

tan 1°=.01746 then for 5D(20cm), MO=(×20)=.03492 cm
tan 2°=.03492, " " " " =.06984 cm
tan 3°=.05241, " " " " =.10482 cm
tan 4°=.06993, " " " " =.13986 cm
tan 5°=.08749, " " " " =.17498 cm
tan 6°=.10510, " " " " =.21020 cm
tan 7°=.12278, " " " " =.24556 cm
tan 8°=.14058, " " " " =.28116 cm
tan 9°=.15838, " " " " =.31646 cm
tan10°=.17633, " " " " =.35266 cm

With MO as radius draw the circles as above with the compasses.

HYALITIS CAUSED BY (*a*) PUS-ABSORPTION AND (*b*) INTESTINAL AUTO-INTOXICATION.

By J. W. Charles, M.D.,
ST. LOUIS, MO.

In the American Journal of Ophthalmology, May, 1912, McCubbin and Gundlach reported "A Case of Optic Papillœdema and Paresis of the Third Nerve Caused by Inflammation of the Ethmoidal Sinuses" on the left side with recovery after complete emptying of the sinuses. The following is a brief history of the case before the operation:

The patient had come to me October, 1910, with severe frontal headaches, worse mornings, which had troubled her for 7 years. Her condition then was O.D. or O.S. Hm. 1, vision=19/12; pupil normal in every reaction, fundus normal except that the veins were larger than usual in contrast with the arteries; disc margins perfectly defined. On account of ethmoidal tenderness and slight fulness, and the fact that she had used glasses without relief, she was referred to Dr. Greenfield Sluder, who examined her for several days without discovering any sinus inflammation. She disappeared before he was satisfied with the exhaustiveness of his examination, and in April, 1911, six months afterward, Drs. McCubbin and Gundelach found her suffering with left internal ophthalmoplegia and both disc margins slightly blurred. Vision in the right eye was 20/24, with the left 20/48. Temp. ranged from 101 to 102.8.

There was improvement after an operation opening the anterior and posterior cells, but the patient returned in a few weeks with severe headaches; vision as before the operation, although the disc-margin of the right eye was more easily defined than before. Ocular movements were perfect in all directions except convergence of O.S. Pupil of that eye was moderately dilated. Two days later, while under daily observation, the vision of the left eye sank to 20/240 to 20/150; the pupil was widely dilated, but a few hours later was normal and reacted to ordinary daylight. Color fields were normal, as well as form-fields, with O.D.; but the left eye failed to differentiate colors. Temp. was 99.6.

On May 10th, the anterior and posterior ethmoidal cells with the frontal and sphenoidal sinuses were widely opened, and on May 11th the headache was less and the pupil somewhat smaller.

Temp.=100. In six days no headache for the first time in years. Temperature remained above normal on June 17th, the afternoon temperature of 100 persisting. Fundus and vision normal.

On July 5th, the patient had an abscess of the cheek following picking a pimple. This was drained and dressed.

July 8th: Had two days before a severe headache of half an hour duration relieved by the evacuation of "several teaspoonfuls" of pus from the left nostril. O.D. with+0.25 cyl. ax. vertl. V=20/15+. O.S. with+0.25 cyl. ax. 115 V=20/15+.

July 10th: Was sent to the Washington University Hospital with appendicitis by Dr. P. G. Hurford. She was discharged August 9th without an operation. Temp.=101.3. Nose in good condition on August 10th.

September 22nd: The patient reported improvement in every respect and that she had gained in weight until September 16th, when she noticed a swelling in the left cheek. The finger in the mouth shows a distinct swelling in the canine fossa. Teeth in good condition. Transillumination show antra clear. Nose in good condition.

February 23rd, 1912: The patient reports to Dr. Gundelach and myself that she has been comparatively free from headaches all winter. Vision=19/15 R. or L. Eyes have ached in near work. After several examinations ℞ +0.37 cyl. ax. vertl. R. and L. and return for full examination.

April 10th: The patient did not return until to-day. Used atropia gr. 1 to ʒii.

April 11th: After atropia 1/120 R. and L. O.D HO.62 V=19/15; O.S. HO.62 V=19/15. ℞ +0.75 Sph. R. and L.

October 16th: Comes with the single complaint of eyes discharging a great deal. Rather vague statements concerning headaches. Without a mydriatic O.D. Em V=19/15, showing slight spasm; O.S. Em V=19/12. Pupils normal. Ophthalmoscope shows O.D., punctations on Descemet's membrane slight, but distinct hyalitis and the nasal margin of disc rather blurred. No lesions visible in chorioid or retina. Veins rather large.

October 21st: The disc-margin of O.D. is distinctly more blurred than that of O.S. Hyalitis is more marked and the punctations on the membrane of Descemet are more numerous. V=as 16th. Pupils are normal in every respect. The patient has intense headaches—both sides. The patient states that her temperature is often 99° to 100°.

The patient was then referred to Dr. Albert E. Taussig for a thorough investigation, in hospital environment, of the patient's general condition. She was admitted to the Hospital of the Medical Department of Washington University October 25th, 1912, where she was kept in bed under observation until November 22nd. During this time her temperature was almost constantly above normal, rising in the afternoon to 101° to 103°. Physical examination gave normal findings. Urine and fæces normal. Wassermann negative and blood culture negative. Tuberculin subcutaneously was not feasible on account of heightened temperature. (In August, 1911, von Pirquet had been "dubious".) The blood count yielded a leucocytosis, the white cells ranging from 10,580 to 12,640. Dr. Taussig reports that this leucocytosis "was strictly one affecting the polyneuclear neutrophiles, the lymphocytes and other cells being always normal in proportion."

On Oct. 23rd, Dr. R. D. Carman took X-ray plates which gave "a possible sinusitis of the left antrum. It is much smaller than the right, the septum being markedly deflected to the right. Sella turcica is normal."

On November 3rd, Dr. Sluder found a suppurating sphenoidal sinus on the left side, but did not believe that it explained the patient's fever. He operated November 12th, thoroughly cleaning out the source of pus.

In spite of the perfect picture of pus-absorption, with its leucocytosis, the patient continued to have fever and to feel miserable.

On November 22nd, she came to the office and her vision was found to be 19/24 R. or L. Emmetropia without cycloplegia. She complains of constant headaches with "striking pains". She says that her temperature was 103 last night. Goes home for recuperation.

December 6th: Temperature remains about 100. O.D. V=19/19; O.S. V=19/15.

January 21st, 1913: O.D. Em V=19/19+; O.S. V=19/19+. Pupils are normal in every respect. The ophthalmoscope gives slight improvement in the appearance of media and disc-margin. The weight of the patient has increased "ten pounds", and fever has disappeared. ℞ Bichloride gr. 1/12 t.i.d. The patient did not return this afternoon for an examination of her fields as directed.

January 29th: The patient reports complete comfort for the last eight days. Her appetite is improving and she is taking care of two young children.

T. A. H., 41 years old, came February 14th, 1911, with vision failing in right eye for some weeks, the history being rather indefinite. Ophthalmometer gave AS 0.5 M vertl. R. and L. Ophthalmoscope gave O.D. vitreous very muddy; O.S. normal. Trial gave O.D. AH 0.5 M 165 Hm 0.25 V=19/38; O.S. Ah 0.5 M Horl. Hm 0.5 V=19/12. Gave note to Dr. H. W. Soper advising bichloride if, after an exhaustive examination, there was yielded no contraindication.

March 20th, after five weeks of treatment with bichloride and purin-free diet: O.D. V=19/30+; O.S. V=19/12+.

April 3rd: O.D. V=19/24; O.S. V=19/12.

May 16th: O.D. V=19/24+.

October 2nd: O.D. V=19/24 to 19/15.

December 31st, 1912: There has been no appreciable change in appearance of fundi nor in the vision, since last examined in October. Dr. Soper's notes follow:

January 27, 1913.

T. A. H., male, age 41 years, married. Occupation, stock man with commission company. Came under my observation December 1, 1910. Drinks an occasional glass of whiskey or beer, but no regular habit. Smokes both pipe and cigars four to five times daily; does not inhale. Drinks one cup of coffee and one cup of tea a day. He has never had any serious illness. Denies all venereal diseases. For the past twelve years has had stomach trouble from time to time. Has definite attacks of gaseous distension and sore feeling in the epigastrium, usually followed by diarrhœa; no nausea or vomiting.

One year ago had a definite attack of appendicitis and the appendix was removed after the attack had subsided. His stomach trouble was better after the operation, until two months ago, when he developed a cough and considerable discomfort in the stomach region three or four hours after eating. Salads and acids seemed to increase the discomfort, which was not a pain but a sort of a burning feeling. A glass of hot water or hot milk caused immediate relief. The cough became worse during the last week, accompanied by some fever and considerable expectoration of muco-purulent material.

He is a man of large frame, 5 ft. 10½ in. in height, weighs 170 lbs. (three months ago he weighed 185 lbs.).

Physical examination of the chest disclosed the presence of sibilant and sonorus râles over both sides posteriorly. Pulse 80, regular, good volume, compressible. Blood-pressure 110; temperature 99 degrees. The abdomen somewhat distended. The entire epigastrium tender to pressure. No enlargement of the liver or spleen. Kidneys not palpable. The urinalysis (24 hour quantity 2000 cc.): Sp. Gr. 1018, yellow in color, acid reaction, albumin faint trace neucleo, no serum, no sugar, no bile. Large amount of indican, no casts, no blood or pus; few leucocytes.

Feces: Acid reaction, dark brown in color, 150 g. well formed. Many large clumps of mucus, no visible blood, no occult blood.

Sputum showed many pus cells. No tubercle bacilli.

Stomach contents after a test breakfast, 30 cc. yellowish liquid, chym fairly good, considerable excess of stomach mucous. Free HCl 50, total acidity 70.

A diagnosis of catarrhal bronchitis, gastritis hyperacida, and general auto-intoxication was made.

Patient stated that dust in the stock yards where he worked was very great and he attributed his bronchitis to this. He was put to bed for a week and the bronchitis improved rapidly; the indican disappeared from the urine in four weeks under a strictly purin-free diet. He quit the stock yards and went to work on a farm.

February, 1911: Dr. Charles discovered opaque bodies in the vitreous. Bichloride of mercury in doses of 1/12 to 1/5 gr. three times daily was given and continued to date.

November 10, 1912: Wassermann reaction negative. Dr. R. Buhman. Von Pirquet *weak* positive, "practically negative." Dr. R. Buhman.

Patient now weighs 182 lbs. and is in splendid physical condition.

The weak spot in the report of both these cases is that the one had von Pirquet only done, and that as far back as 1911, and her condition was such that Dr. Taussig did not believe it advisable to give a subcutaneous diagnostic tuberculin test; and the other case had a weak positive reaction to the von Pirquet test which Dr. Buhman asserts was practically negative. These weak points will be strengthened as soon as possible, but the diagnoses seem so certain without this procedure that I feel that absorption of pus in the one case and auto-intoxication in the other were the causative factors.

MEDICAL SOCIETIES

TRANSACTIONS OF THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

January 9, 1913.
Dr. Wendell Reber in the Chair.

EXHIBITION OF CASES.

Dr. William Campbell Posey showed a man from whom he had recently removed a large carcinoma from the orbit with preservation of the globe. Although it had been necessary to enlarge the incision proposed by Krönlein by a horizontal one which extended below the superciliary ridge and parallel to the supraorbital margin to permit the removal of the growth, the deformity was exceedingly slight, the lines of incision being barely visible.

A Tansley-Hunt operation had been performed some months after the Krönlein procedure to relieve the ptosis occasioned by the loss in function in the levator consequent upon the division of the nerve supply. Full details of the clinical history and the pathological report will be given later.

Dr. Reber called attention to the excellent motility of the globe and the splendid position of the eyeball and stated that it was the most perfect result after a Krönlein operation that he had ever seen. One really had to hunt for the scar left by the temporomalar incision.

Dr. Reber exhibited a case of a young colored woman, 18 years of age, with a violent bilateral uveitis anterior, reducing vision to about 1/60 in each eye. She had lived to the flesh with all her might and main; result, a strongly positive Wassermann reaction.

The left eye had shown a very small scleral staphyloma from 2 to 3 mm. in diameter just back of the upper outer limbus but it had subsided promptly on treatment. The right eye then began to develop hypertension with great supraorbital pain and narrowing of the anterior chamber. This became so marked that a paracentitis was done with consequent prompt reduction of the tension, but after a few days a scleral staphyloma began to bulge forward at the lower limbus and in spite of all medical treatment continued to increase in size until it was larger than the cornea itself. During all this time the tension remained about minus one, and the patient was absolutely free from pain. The patient was seen in consultation with three or four colleagues, all of whom inclined to the diagnosis of gumma and two of them were quite convinced that enucleation would become absolutely necessary. Neo-salvarsan and mercurial inunctions had been used for about two weeks without any benefit. At this juncture the eye was thoroughly cocainized and 3 drops of absolute alcohol (95 per cent.) were introduced directly into the substance of the ectasia by means of a hypodermic needle. Within five days the ectasia was hardly in evidence and within ten days there was nothing to mark the site of the previous extensive staphyloma other than a broad pigmented line along the lower limbus. Dr. Reber speculated upon the possible conditions that existed within the ectasia, rejected the idea of gumma and thought it might have been a cystic condition.

Dr. Posey in discussing the question also rejected the idea of gumma, although he saw objections in the way of assuming that the condition was a cystic one.

The Use of Bifocal Glasses in the Orthoptic Treatment of Strabismus in Children.—Dr. Wendell Reber.

Dr. Reber discussed the various theories for the genesis of convergent strabismus in little children, saying that he was convinced that the usual clinical picture was that of a weak or even entirely absent fusion sense complicated by a more or less unequal refractive error. With a weak fusion sense the accommodative apparatus of the eye easily falls into vicious habits. The correction of these vicious states of the accommodative apparatus have been made up to the present time, by the use of practically full correction and the continuance of atropia in one or both eyes for one to three months after the glasses were put on. Two years ago he had come to the conclusion that it could do no harm to carry this idea to its logical sequence. He therefore not only ordered a full correction for infinity, but to this added plus 2 to 3 D. to be made up in an invisible bifocal glass, thus setting aside practically all accommodative effort in the eyes of these little subjects, whose accommodation is so abnormally spastic. The combination of bifocal glasses and atropia in both eyes for two to three months is the most complete orthoptic method for the abolition of accommodative spasm, with its associated over-convergence.

The first of such glasses ordered were made up in lenticular bifocals, but they excited so much comment when worn by a 4 year old child and subjected the parents to such unceasing questions from every interested person that the glasses were made up in an invisible bifocal. Bifocal glasses have been tried in this way in 8 cases of seemingly pure functional strabismus. That is to say, no congenital features present in any of the cases.

Dr. Reber has been much impressed by the excellent results achieved in these 8 cases and thinks they are superior to those secured by the methods at present in vogue. One objection is that the little patients at once try to dodge the bifocal and for the first week bob their heads about a good bit, but they soon learn to adjust themselves and the bifocal's good effect upon the deviation seems to follow soon after. He feels that the method is well worth the trial.

DISCUSSION.

Dr. Posey expressed his appreciation of the value of Dr. Reber's suggestion, and said that as Dr. Reber claimed, the removal of the accommodative effort by the superposition of additional spherical strength in the bifocal slips, was quite in line with the teachings of Donders and should tend to establish as far as was possible the normal relationship between accommodation and convergence which was necessary for straight visual axes. The only objection he had to offer was the difficulty there might be in adjusting the slips to the squinting eyes. Dr. Posey was averse to glassing children younger than three years of age and decried the practice of some of tieing the spectacles on the heads of infants with tapes, upon account of the danger of the pressure exerted by the glasses upon the root of the nose, altering the formation of the lines of the face and interfering with the proper development of the orbit. He insisted upon the early differentiation of cases of congenital squint from those under discussion. He doubted if in cases of concomitant squint, vision sank as rapidly in the squinting eye as Worth has averred.

Dr. Zentmayer said that believing as he does in the correctness of the theory of Donders as to the cause of esotropia, he considered Dr. Reber's method rational, but not generally practicable in young children. Exactly the same thing has been recommended for esophoria, that is, to diminish the accommodative effort at near-work by the addition to the distance glass of a plus 2 or 3 D. lens to be worn for near-work.

Dr. Pfeiffer said he had little confidence in Worth's method. Experience had shown him that it required very intelligent parents to permit following out similar plans to Dr. Reber's on children. He thought that with a lower segment, no matter how it was shaped, there attended an effort on the child's part to look around the edge to escape the more powerful glass.

Dr. Reber, in closing: There is no question, as I pointed out in my opening remarks, but that these little patients have difficulty the first week or ten days in getting used to the bifocal glass. In no one of the cases has the discomfort extended beyond this time. The influence of the fusion faculty on the genesis of strabismus in little children cannot be lightly regarded. It is perfectly true, as Dr. Zentmayer says, that the use of a plus 2 to 3 over the infinity correction has been in vogue for some years. In the first edition of Hansell and Reber on the "Muscular Anomalies of the Eye," (1896) this method of the treatment of esophoria was gone into at some length, and during these 17 years we have resorted to the method in a goodly number of cases with gratifying results. Indeed it was the success of these cases which led us to apply the above mentioned method in strabismus of little children. If the object of the orthoptic treatment of strabismus is to break up the vicious accommodative habits into which the visual apparatus has fallen we believe this will prove to be a contribution to the orthoptic treatment of squint.

W. Walter Watson, M.D.
Secretary.

[*Continued in April number.*]

CORRECTION.

Dr. W. Franklin Coleman is not located at Toronto, as might appear from the title of his book reviewed in the February number of this Journal, page 63. He resides at Chicago.

THE ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

The first clinical meeting of the Section was held on Wednesday, 6th November, under the Presidency of Sir Anderson Critchett, C.V.O.

Mr. Herbert Fisher showed a case of subhyaloid hæmorrhage, with drawing. He urged the abandonment of the term "subhyaloid hæmorrhage," as the hæmorrhage was intra-retinal; he suggested the words "semilunar retinal hæmorrhages." The President agreed with the suggestion.

Mr. A. W. Ormond showed a case of pemphigus of the conjunctiva, followed by essential shrinking. The patient was 24 years of age, and as his general condition as well as his sight were now so bad, he pleaded for something to be done. Mr. Ormond proposed to clear away the conjunctiva as much as possible, and substitute mucous membrane from elsewhere. Mr. Fisher referred to a case of pemphigus of the conjunctiva, which was later under Mr. Lawford's care, in which a vaccine made from the contents of the patient's own vesicles, was administered for some time, but without marked benefit. Mr. Lawford confirmed the fact that there was no definite improvement after the vaccine treatment. Mr. Bishop Harman described a very severe and extensive case, involving larynx, pharynx, mouth, and both eyes, in which no treatment was of use.

Mr. R. Greeves showed a case of paralysis of the third nerve with periodic spasm of irido-ciliary muscles. He said he could not make out any relationship between the movements of the two eyes. He thought the right pupil was a little unsteady, but it seemed to have nothing to do with the contractions and dilatations of the other eye. Mr. Herbert described a somewhat similar case, and suggested an explanation, namely, that a portion of the nucleus of the third nerve was non-existent and the other portion of it was weak, so that it was able to overcome the innervation of the higher centres only after an interval of rest.

Mr. Herbert Parsons showed a case of Mooren's ulcer, with ulceration of the sclerotic, and Mr. Leslie Paton demonstrated a modification of Herbert's operation for chronic glaucoma, in which his object had been, while retaining the simplicity of Herbert's operation, to procure a more permanent result. Mr. Herbert described his own attempts in the same direction, emphasizing the importance of not reducing the nutrition of the flap too much. The difficulty arose chiefly in subjects who had a very shallow anterior chamber.

Mr. E. Nettleship read notes of a case in which a sarcoma of the choroid was seen as a small spot of disease, but its true nature not recognized, about 20 years before the diagnosis of tumor was made, and 25 years before the removal of the eye. The case showed the importance of watching over long periods, when possible, the behavior of certain solitary spots or patches of dusky discoloration that are occasionally seen in the choroid during ophthalmoscopic examination, some of them probably being the beginnings of malignant growth, although others were, no doubt, congenital and stationary. Such solitary, non-inflammatory patches might sometimes be the counterparts of the minute sarcomatous growths, of which nine or ten examples have been accidentally discovered after death and published during the last few years.

Mr. Nettleship also read a joint communication by himself and Mr. A. Hugh Thompson on an extensive pedigree of Leber's disease of the optic nerves, which illustrated the occurrence of the malady in females, recovery in some cases in both sexes, descent to all the children of one of the affected women, diabetes with blindness of unknown nature in one member, high infantile mortality in the very large family of one affected man, and absence of influence of the optic nerve disease upon prospect of life.

The President paid a tribute to the labors of Mr. Nettleship in the domain of hereditary disease, and referred to the changes of medical opinion on the subject of heredity. Mr. Hugh Thompson supplemented the paper in respect to one patient, who was a heavy smoker, and suggested that in cases of tardy recovery from tobacco amblyopia enquiry should be made as to any connection with Leber's disease.

Mr. A. W. Ormond read a paper on a case of retino-choroiditis juxtapapillaris. The patient was a man, aged 20, who found, on awaking, that he could not see very well with his right eye. He had a little pain in the eye a week previously. On examination there was found keratitis punctata, and a patch of acute choroiditis touching the upper margin of the optic disc, and spreading upwards. Œdema of the retina spread over and beyond the patch. Vessels which passed over the inflamed area were partly obscured, and the arteries diminished in size; there was also some haze in the vitreous. Von Pirquet's reaction was positive. The inflammation gradually subsided, and the patient now had full visual acuity, but a large sector of his field of vision, stretching from the blind spot to the extreme periphery, was entirely absent, and he had no perception of light in this area. The defective area in the field of vision was clearly due to the obliteration of a branch of the central retinal artery by the pressure of the inflammatory swelling. Under the title retinochoroiditis juxtapapillaris Professor Jensen, of Copenhagen, published four similar cases in Graefe's Archives, in 1909.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

December 4, 1912.

Sir Anderson Critchett, Bt., C.V.O., President of the Section, in the Chair.

Discussion on the Physiology of the Intra-Ocular Pressure.—Opened by Leonard Hill, M.B., F.R.S., and E. H. Starling, M.D., F.R.S.

Dr. Leonard Hill, F.R.S.: Some researches which Dr. Flack and I have been carrying out on the relation of the circulation to secretion led us to investigate the eye, and the results of our investigation have been published recently in the *Proceedings of the Royal Society;* these we propose to bring before you to-night. The first task we set before us was to try and measure the intra-ocular pressure. Mr. Thomas Henderson and I made preliminary experiments. We were not satisfied with using the ordinary hypodermic needle, for we could not avoid leakage in the track of such a needle. That led to my devising a special needle, a sketch of which I show you on the screen. Dr. Flack and I have employed this in our measurements on the intra-ocular pressure. It is made of two tubes. The inner tube can be rotated by means of a handle, and there is an eyehole in it which corresponds, in a certain position of rotation, to an eyehole in the outer tube. When the two holes are opposite the aqueous humor can pass into the inner tube. If we rotate the handle right round, the eyehole of the inner tube is no longer in correspondence with the eyehole in the outer needle, and the needle is closed. As we put it in closed, no aqueous can escape. We have a conical shaped needle, and it goes in as a cone, and that prevents leakage, and when it is in, we rotate the needle, until the eyeholes correspond. The aqueous pressure is measured by the compensatory method which I employed for measuring the pressure in the brain. The inner tube of the needle is connected with a length of glass tubing of fine bore which in its turn is connected with a pressure bottle and a mercury or a water manometer. An air bubble is introduced into the glass tube, and the position of it marked when the pressure is at zero, that is to say, at atmospheric pressure. The zero position is obtained when the eyehole is open in the needle, and the pressure bottle is lowered to such a point that the water within it is at the same level as the eyehole, and ceases to flow out. Having marked the position of the air bubble on the glass tube, we push the closed needle into the aqueous, and transfix the anterior chamber with it so that it is steady. We support the needle so that it exerts the least possible tension on the eyeball, and then rotate the handle so as to open the needle. The air bubble is pushed out, and the moment it is pushed so, we bring it back to the zero mark, by raising the pressure bottle, and thus compensate the pressure of the aqueous without letting any of this fluid escape. Then we read the pressure. When inserting the needle we try to get as near the edge of the cornea as possible, and push it right through. The hole lies in the aqueous, and we make sure it is free in the aqueous, and we can see it in there. It is very important to support the needle, because any traction on the eyeball will raise the pressure of the aqueous, and that is a great source of error. Mr. Thomson Henderson has suggested another source of error—namely, that the introduction of such a needle into the eyeball may cause some reaction in the eye; a temporary obstruction of the circulation occurs during the introduction of the needle, and a subsequent dilatation of blood-vessels probably results, which raises the pressure to a greater level than the normal. Such a reaction would soon subside. We have controlled the reading of the needle in this way. We pushed into the same eye or into the opposite eye a hypodermic needle, a very small one, connected with a gauge which I use for measuring blood-pressure. The central readings taken by means of this gauge show that the aqueous pressure varies within fairly wide limits, depending upon the blood-pressure. The higher the arterial pressure, the higher is the aqueous pressure. We have got readings as low as 16 mm. Hg. in one cat under chloroform and with a low arterial pressure, going up under ether narcosis, when the animals were in good condition, as high as 62 mm. Hg. Variations of the kind, agreeing between arterial and aqueous pressure, left no doubt in our minds on the point. In comparing the readings with the hypodermic needle with those with our needle, done by the compensation method, we got readings which seemed to agree. So we could not find much source of error.

So much for the aqueous pressure. We do not very much mind what the aqueous pressure is, as it is not of very great importance except that it is positive. It is very important that it should be positive, because that keeps the eyeball as a perfect optical instrument. The eyeball is distended, in our opinion, by a secretory pressure, and that keeps it as a perfect optical instrument, perfect in its shape, equally distended all over. And to preserve that, positive pressure is required, and it does not seem to matter very much whether that positive pressure varies from 10 mm. to 50 mm. Hg., for the outer coat of the eyeball is firm enough to resist any distension, and the eyeball remains the same shape and size under very different strains. When a man is making an effort he may have an arterial pressure of 150 to 200 mm. Hg. The pressure of his aqueous may then be 50 to 70 mm. Hg. When he is at rest his arterial pressure will be about 100 to 120 mm. Hg. and his aqueous 20 to 30 mm. Hg. We accept the common theory that the aqueous is secreted by the choroidal fringes, and we maintain that the aqueous is practically at the same pressure as the capillary venous pressure in the choroidal fringes. There is nothing between these fringes and the aqueous but layers of protoplasmic cells containing some 80 per cent. of water. The capillaries are enclosed by a transparent, excessively thin membrane, the capillary wall also is composed of wet protoplasm. We do not know how much water this protoplasm contains. Connective tissue and membranæ propriæ limit the expansion of the cell protoplasm, but we find no evidence of structure which can hold the capillaries open when pressed on by the aqueous from outside. Capillaries elsewhere in the body are collapsed and emptied with the greatest ease by pressure applied outside—e.g., in the skin and brain. We maintain that the pressure of vitreous and aqueous, which has been proved to be always the same, is equal to the pressure in the veins at the place of exit from the eyeball. If it was greater, the veins would be shut up. There is nothing in the wall of the veins which can support pressure from the outside. So we maintain that the pressure in all the various venous exits must be the same as the intra-ocular pressure, and the pressure therein and in the capillaries is practically identical. The least (immeasurable) difference aided by the pulse (transmitted through the contents of the eyeball) will suffice to maintain the flow from capillaries to veins. Muscular contraction of intrinsic and extrinsic muscles of eyeball also maintains capillary-venous flow as elsewhere in the body. One of the experimental proofs which we bring forward with regard to this point is this: If we open one of the vortex veins in the eye of the cat, allow the blood to escape from there, and force Ringer's solution to run into the aqueous, by raising the pressure bottle, the outflow from that vein stops when the aqueous pressure is raised to the arterial pressure. This shows that the two pressures go up together; the aqueous pressure and the capillary pressure rise together, and when you reach the arterial pressure the outflow stops. It is the same as putting an armlet and sphygmomanometer on the arm, and gradually raising the pressure of the armlet to nearly the arterial pressure; the veins will get fuller and fuller until the pressure in the veins gets to the same as the arterial pressure, or almost the same. So we put in the fluid and raise the pressure in the eyeball: we finally stop the venous outflow, and the pressure required to stop the flow is the full arterial pressure. That is confirmed by observations made by a different method. The method is this: Looking at the back of the eyeball, and watching the flow in the retinal vessels, another observer, v. Schulten, found very much the same thing: that the flow ceased, as viewed from the ophthalmoscope, when the pressure reached the arterial pressure. This shows, to our minds, that the two pressures go together, and that if you raise one you raise the other.

I now show you two photographs of cat's eye, taken after an experiment made to-day. Afterwards I will show you in the epidiascope the actual eyes. The experiment we did is a very easy one to perform, and very striking and interesting. We simply punctured the cornea of one side, and allowed the aqueous to escape. On then gently pressing on the belly of the cat, the iris on this side immediately burst into hæmorrhage; all the capillaries allowed blood to escape. That comes off every time. The explanation is that the normal aqueous pressure is exactly counterbalancing the capillary pressure. If you allow aqueous to escape and then press the belly to raise the arterial pressure, the capillaries at once burst, and hæmorrhage takes place into the anterior chamber. That shows that the two pressures are one and the same, the one supporting the other, and explains why there is hæmorrhage in operations and injuries to the eyeball. I do not know whether the explanation is new to you as ophthalmic surgeons; it may be that all of you have already recognized that that is the explanation. It is perfectly clear that the aqueous no longer supports these blood-vessels, and therefore when the blood-pressure is raised they burst, and hæmorrhage takes place.

The aqueous has a distinct chemical nature, and its osmotic pressure is said to be higher than that of the serum. And we know that if fluorescin is put in intravenously, as Ehrlich did, it is secreted, and appears in the anterior chamber, and can be demonstrated there. That shows that some kind of circulation is going on in the aqueous. But to-day I saw a record of some observations, which showed that if fluorescin were put in so that there was one part in 20,000 circulating in the blood there was found one part in 400 in the urine, and one part in a million in the aqueous fluid. Therefore you see it does not get concentrated in the aqueous and the method does not show that the aqueous is being rapidly secreted and absorbed. The observations of Ehrlich are very beautiful, showing as they do the secretion of the aqueous, and the very important fact, which is known to all workers on the eyeball, that if the anterior chamber is pierced, the subsequent secretion is quite different and is far more intensely tinged with fluorescin; it is one which contains blood corpuscles, is rich in albumin, and like serum. It is a leakage secretion. So we maintain that the secretion, or absorption of the aqueous, cannot be studied in any way by opening the eyeball, or allowing the aqueous to escape, because the conditions are entriely altered. We must have a closed eyeball, with the aqueous pressure balancing the capillary as it naturally does.

I pass now to the consideration of the fluid of the eyeball in relation to accommodation. I want to deal with the transference of fluid from in front of the lens to the side of the lens, which we think is a most important point in accommodation. In whatever way it may be brought about there must be this transference of fluid, and the mechanism of accommodation is thereby coordinated in the most delicate way, because the transference of the least quantity of fluid can bring about instantly, in a most beautiful way, the changes in the shape of the lens.

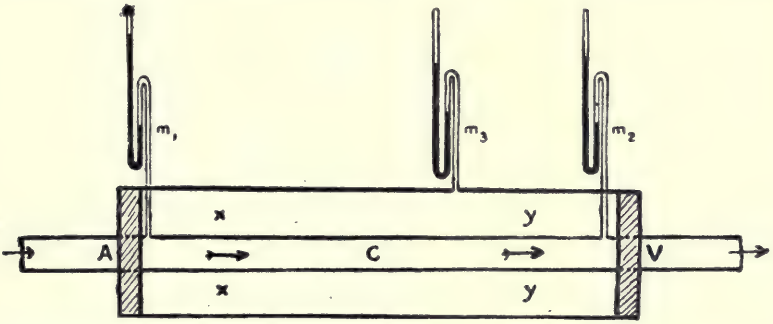
It is always said that the lens capsule and the suspensory ligament are in the eye, exerting elastic pressure on the lens, and causing it to assume its less convex shape. What is the cause of that shape? We maintain it is the intra-ocular pressure; it is the pressure in the aqueous and the vitreous maintained by the secretory action of the choroidal fringes. The contraction is equal in all directions in the eyeball, which pulls on the suspensory ligament and keeps this lens in its natural shape. And if you cut out the lens from the body, it increases its curvature, and why? Because it is taken from the influence of the intra-ocular pressure, and yet many people say the lens alters its shape by virtue of its elasticity. But the lens, when cut open, does not seem to have any elasticity at all; it is a soft, pudding-like body with no inherent elasticity. We say it is kept in its flattened shape by intra-ocular pressure. It alters its shape afterwards, when it is removed from that pressure. The eyeball is equally distended by the intraocular pressure in all directions, and it does not seem possible to us that the choroid should be pulled forward at all. What we think happens in accommodation is that the muscle contracts, and when a muscle contracts it does not diminish in size, but it occupies the same volume as uncontracted muscle. And when the ciliary muscle contracts it moves inwards, exactly as described by Henderson, and it may also move forwards, as Starling describes in his text-book. This allows the fluid to pass from in front of the lens either into the grooves of the ciliary body, or into the spaces of the cribriform ligament, and into the supra-choroidal space. We cannot, dogmatically, say where this fluid goes, because we have not made a special study of the structures of the eyeball from this point of view. But we maintain that the fluid must pass from in front of the lens to the side of the lens. It must do so to satisfy the physical conditions; there is no getting away from it, and Helmholtz recognized that in supposing that the angle of the anterior chamber was deepened during accommodation. Thomson Henderson says that anatomical study will not allow of Helmholtz's idea.

Professor E. H. STARLING, F.R.S.: Although I am in full agreement with most of the facts brought forward by Dr. Leonard Hill, I do not agree with him so closely as to the interpretation to be placed on these experimental results. From the practical point of view it is of more importance to know what the factors are which determine the formation and absorption of the intra-ocular fluid than to arrive at an agreement as to the theory of its production—whether, for instance, it is due to some mystical process of secretion, some intra-cellular changes which at present we cannot understand, or whether the mechanical processes of filtration are sufficient to account for its production.

Some years ago I took advantage of Mr. Erskine Henderson's assistance to investigate the factors which determine the production and absorption of this fluid. The seat of its production we need hardly discuss, since it is generally agreed that the chief seat of production is the ciliary processes and the chief seat of absorption the anterior angle of the eyeball and the root of the iris. Covering the ciliary processes there is a well-marked epithelium with columnar or cubical cells. These cells are as well formed as those of the salivary glands, or of the kidney tubules, and might therefore easily be assumed to be endowed with secretory powers. Thus *a priori* there is no reason to question the possibility of the intra-ocular fluid being regarded as a secretion.

On the other hand, this epithelium is derived from the optic cup, and is, therefore, a nervous epithelium which is no longer functional. We might consider that it had changed its function and had become a secretory tissue, or that its cells serve simply to support the capillaries and modify the filtering membrane through which the transudation of fluid into the eyeball occurs. In investigating the nature of any process we must start with a hypothesis and proceed from the explicable to the unexplained —from what we can understand to what we want to understand. We must, therefore, in the first place consider what conditions must be observed if the intra-ocular fluid is to be regarded as produced by a process of filtration from the blood circulating in the ciliary processes. In this case the energy necessary for its formation would be derived from the blood-pressure and ultimately from the heart, and not from secretory work effected by the cells covering the ciliary processes. The intra-ocular fluid in the eye is at considerable pressure; there must, therefore, be a resistance to its outflow from the eyeball, a resistance which can only be overcome by a certain pressure. But if the fluid in the eyeball is formed from the blood in consequence of the pressure of the blood in the capillaries, the pressure of the intra-ocular fluid must rise and fall with the intra-capillary pressure. Professor Hill has already told you that the intra-ocular pressure varies with the blood-pressure, and this fact was well brought out in the work that I carried out with Mr. Henderson. In every case where we raised the blood-pressure in the vessels of the eyeball the intra-ocular pressure went up proportionally and remained high so long as the blood-pressure remained high. It is not merely a question of dilating the vessels by a rise of pressure and thereby increasing temporarily the intra-ocular pressure. So long as the blood-pressure is high the intra-ocular pressure remains high. On the other hand, on cutting off the blood supply to the eyeball the intra-ocular pressure rapidly falls and the eyeball becomes flaccid.

With regard to the normal height of the intra-ocular pressure, I find it difficult to understand how Professor Hill obtained the very high figures he has given us, namely, 16 mm. Hg. to 62 mm. Hg. I have certainly obtained intra-ocular pressures approaching 50 mm. Hg., but this was with exceedingly high pressure in the blood-vessels of the eye. Ordinarily, however, the blood-pressure is much lower, and we concluded that in a normal unæsthetized animal the average pressure would be not more than 25 mm. Hg.; and a similar figure is given by about a dozen authorities cited by Leber. I think most ophthalmologists would regard a pressure above this point as abnormally high. Not only does the intra-ocular pressure rise and fall with the general blood-pressure, but it can be shown to depend on the local blood-pressure. Thus, if the sympathetic nerve of the neck be stimulated a double effect is produced—first a contraction of the unstriped muscles of the orbit with a rise of pressure, and then, as the vessels of the ciliary processes contract so as to diminish the pressure in the capillaries there is a fall of intra-ocular pressure.



Professor Hill has stated that the pressure in the capillaries and veins of the eyeball must be equal to the intra-ocular pressure. I find it difficult to understand his reasoning. The condition in the eyeball may be roughly made on a model such as is shown in the diagram, where ACV is the thinnest possible rubber tube passing through the axis of a rigid glass tube *xy*. *xy* contains fluid, and fluid is allowed to pass under pressure from A to V. If the pressure in *xy* is greater than the pressure within the rubber tube, this collapses. If fluid is to pass through ACV it must have pressure all the way along which is somewhat greater than the pressure in *xy*. Now ACV represents arterioles, capillaries and veins, and it is evident that the blood-pressure in these vessels must be somewhat higher than the intra-ocular pressure as represented by the pressure in *xy*. The quicker the rate of flow through the vessels the greater must be the difference of pressure between A and C, and between C and V, and the greater the difference also between the pressure in the elastic tube and the pressure in the space surrounding it. This difference may be of any extent until it is sufficient to burst the rubber tube.

From these considerations you will see that it is impossible to have the conditions assumed by Hill—namely, an equality of capillary and venous pressures. So long as the blood flows from C to V, so long must the pressure at C be greater than the pressure at V.

There is another factor which will tend to exaggerate the difference of pressure between capillaries and veins. Since the kinetic energy of the blood in the veins is greater than that of the slowly moving blood in the wider area of the capillaries, the component of the energy moving the fluid represented by the lateral pressure of the walls must be greater in the case of the capillaries than in that of the veins. Thus a large flow of blood from capillaries to veins involves a considerable difference of pressure between these two points. Professor Hill has stated that the capillaries in the ciliary processes are very delicate and would not, therefore, stand any appreciable pressure. This, however, is a pure assumption, and does not take into account the small cross-section of these vessels. Naturally, if these capillary walls surrounded a balloon a foot in diameter it would burst at the slightest excess of pressure in its interior, but a capillary wall 3 or 4 μ in thickness, surrounding a tube with a lumen 7 μ in diameter, might be expected to stand a considerable pressure before it ruptured. Certainly a bicycle tyre in which the thickness of the wall had the same relation to the lumen of the tube would be strong enough for all practical purposes.

There are no experimental facts which exclude the possibility of a considerable difference of pressure existing between the capillaries and the fluids outside them. Such a difference may be shown to exist in the connective tissue of the limbs. Many years ago, after reading a book by Landerer on the tension of the tissue spaces, I spent several months measuring this pressure. In all cases I found that the pressure was extremely small—namely, 2 or 3 cc. of water, whereas the pressure in the capillaries might be 20 or 30 mm. Hg.

We are not justified, therefore, in denying the possibility of a difference of pressure between the blood in the capillaries and the intra-ocular fluid, and we must assume that, if the circulation is to continue, a considerable difference of pressure exists between the blood in the capillaries and the blood in the veins. The venous pressure itself must be higher than the intra-ocular pressure. If, in the model, the pressure in *xy* is raised to the pressure at V, the tube at V will collapse. As soon as the circulation through ACV is thus brought to a standstill the pressure at V will rise to the pressure at A and the circulation will go on again; that is to say, the circulation through ACV will not be brought to a standstill until the pressure in *xy* is just higher than the pressure at A; which, being interpreted, means that in order to stop the blood-flow through the eyeball naturally, the intra-ocular pressure must rise to the pressure of the blood in the arteries entering the eyeball. That does not, however, tell you what is the pressure in the capillaries of the eyeball under normal conditions; it only gives the upper limit of this pressure and does not mean that the intra-ocular pressure under normal circumstances is equal to the capillary pressure.

Assuming that the intra-capillary pressure is the main factor in determining the production of intra-ocular fluid, it is important to know what is the rate at which fluid is turned out. So long as the intra-ocular pressure remains constant the rate of absorption must be equal to the rate of production. In order, therefore, to measure the rate of transudation, we must measure the rate of absorption at the same pressure. This can be determined by putting a hollow needle into the eye, filled with fluid at such a pressure that the intra-ocular pressure is just balanced, so that fluid neither enters nor leaves the eye. The heart is then cut out so that the pressure in the vessels sinks to zero. No more fluid is now being poured out by the ciliary processes, but the intra-ocular pressure is maintained at the same height as before by its connection through the hollow needle with a reservoir of Ringer's fluid. The Ringer's fluid therefore flows into the eye, and the rate at which it flows gives the rate at which the intra-ocular fluid was being absorbed just before the death of the animal. In a series of observations made by this method, Henderson and I found that, at the normal intra-ocular pressure, the rate of absorption was about 12 c.m. per minute, and this is, therefore, the normal rate of production of intra-ocular fluid by the ciliary processes.

The proofs I have given you that the intra-capillary pressure of the ciliary vessels is the most important factor in the production of intra-ocular fluid, and that the intra-ocular tension depends on the balance between the production as regulated by the blood-pressure and the absorption as regulated by the resistance at the anterior angle of the eye, do not necessarily imply that the intra-ocular fluid is merely a filtration. It might be that the cells were being stimulated by the blood-pressure, so that the secretion increased or diminished as the blood-pressure rose or fell. Before we can assume that the process is one of filtration we must account for the fact that the fluid, though containing practically all the salts of the plasma, is almost entirely free from protein. The slightly increased molecular concentration of the intra-ocular fluid as compared with blood plasma might be ascribed to metabolites produced by the cells. But if we assume that the capillary wall *plus* ciliary epithelium is a filtering membrane which is impermeable to colloids such as the blood proteins, there would have to be a minimum difference of pressure of about 30 mm. Hg. between the blood in the capillaries and the intra-ocular fluid for any filtration to take place at all; otherwise the blood-vessels would absorb the intra-ocular fluid. Thus the filtration theory demands not only some difference of pressure in favor of the capillaries, but that the pressure in the capillaries shall not be less than 30 mm. Hg. above that of the fluid in the eyeball. Unfortunately, we have no method at present of measuring the intra-capillary pressure in the eyeball directly. It is true that there is always a considerable difference of pressure between the blood in the large arteries and the intra-ocular fluid, and the difference may be from 70 to 90 mm. Hg., but it is impossible to say how much of this pressure in the arteries is transmitted to the capillaries of the ciliary processes. It is impossible, therefore, at the present time to furnish the crucial proof of the filtration hypothesis. But the strict parallelism which exists between the blood-pressure and the intra-ocular pressure and the fact that with a rise of blood-pressure, the intra-ocular pressure increases, as well as the amount of fluid escaping through the anterior angle of the eye, shows us the intra-ocular fluid merely as a result of balanced mechanical processes; and at the present time there is no evidence of any other processes, and we are not justified in assuming that the epithelium covering the ciliary processes acts otherwise than passively in strengthening and modifying the qualities of the filtration membrane.

We have finally studied the conditions which alter the rate at which fluid escapes from the eyeball. Why does one not always find a permanent rise of intra-ocular pressure with a rise of arterial pressure? The association is certainly seen, but it is by no means constant. The explanation is probably found in some experiments by Henderson and myself. If we try the effect of raising the intra-ocular pressure artificially, we find that a little time after raising the pressure to 50 or 60 mm. Hg., filtration becomes more easy, as if additional channels had been opened up or pre-existing channels enlarged. A similar change might occur in the normal eye, and in this way the intra-ocular pressure might be kept at a normal height, although the arterial pressure was permanently raised. We have also tried in the same way the effect of atropine and eserine on the rate of escape of intra-ocular fluid from the eyeball. At normal pressures no difference was found between the eserined eye and the atropinized eye.

CAT, ANAESTHETIZED WITH ETHER. BLOOD-PRESSURE AVERAGE 138 MM. HG., WITH ONLY TRIFLING VARIATIONS THROUGHOUT THE EXPERIMENT.

Intra-ocular pressure in mm. Hg.	Rate of filtration in eserine eye in cubic millimetres per minute	Rate of filtration in atropine eye in cubic millimetres per minute	Rate of filtration in atropine eye post mortem, in cubic millimetres per minute
20	0	0	12
35	11	8	20
50	16	11	25
65	23	14	31

At 20 mm. Hg. the rate of filtration was 0 in both eyes. At 35 mm. Hg., intra-ocular pressure the filtration from the eserine eye was 11 cc., and from the atropinized eye 8 cc., and this difference augmented as the pressure was raised to 65 mm. Hg. I believe our experiments would be in accordance with clinical observations as to the influence of these drugs on normal and glaucomatous eyes.

I might finally say a few words on one or two other points which have been raised by Professor Hill. He drew attention to the hæmorrhage into the eyeball, which occurred in the cat after letting off all the intra-ocular fluid, and then raising the blood-pressure by pressure on the abdomen. On the filtration hypothesis the normal difference of pressure between the blood in the ciliary capillaries and the intra-ocular fluid is about 35 to 40 mm. Hg. I do not think there is any difficulty in understanding why a sudden rise of this pressure to something between 100 and 160 mm. Hg., as would occur under the conditions of Hill's experiments, should cause actual rupture of the capillaries and hæmorrhage into the eyeball.

With regard to the question of absorption from the eyeball, he pointed out that the spaces of Fontana in the canal of Schlemm were separated from the anterior chamber by epithelium. The same condition obtains everywhere in the lymphatic system. The lacteals in the villi have a continuous endothelial coat, and the endothelium of the diaphragm is continuous over the stomata, and yet particles of Indian ink or milk globules pass easily by these stomata into the underlying lymphatics. The apparently continuous endothelium does not stop the passage of fluid or even the fine particles. Filtration through it may occur without any rupture of the membrane.

Mr. PRIESTLEY SMITH said the subject was a large one; he would not enter on the question of the accommodation of the eye, though he would have liked to criticize what had been said, but would confine himself to one or two points connected with the physiology of the intra-ocular pressure. The pressure in the healthy eye varied in different persons, and in the same person at different times. There was no absolute normal. What was normal for one eye might be abnormal for another. The average was about 25 mm. Hg. Healthy eyes doomed to excision by reason of orbital tumor had been tested by the manometer with this result. A pressure of 60 mm. Hg., which Dr. Hill had found under certain circumstances in the eyes of animals, was much above the normal for animal and man. In the human eyes it was equivalent to a severe glaucoma.

Dr. Hill maintained that the intra-ocular pressure was equal to the blood-pressure in the veins and capillaries within the eye. The speaker thought that it was equal to the venous pressure at certain points only—viz., at those points where the veins left the eye, but that elsewhere, and especially in the capillaries which produce the intra-ocular fluid, the blood-pressure was higher than the intra-ocular pressure, which he would call the chamber pressure. Dr. Hill's observation had shown that the intra-cranial pressure was equal to the blood-pressure in the torcular Herophili, but he had not shown that the blood-pressure in the torcular was equal to that in the veins in other parts of the skull, or in the capillaries; if there was no difference of pressure throughout these vessels there would be no movement of the blood, as Professor Starling had pointed out. In a considerable number of healthy human eyes the behavior of the central vein of the retina close to its point of exit showed a delicate balance between blood-pressure and chamber pressure. With each incoming arterial wave the chamber pressure rose above the blood-pressure at this point and emptied the vein; between the waves it fell below the blood-pressure and the vein refilled; the two were in approximate equilibrium, and each in turn gained the mastery. In the majority of eyes the blood-pressure was a little the higher of the two, and the arterial impulse transmitted by the vitreous was not sufficient to empty the vein even close to its point of exit. Further from the point of exit, and especially in the capillaries of the ciliary body, the blood-pressure must be higher still.

He would like Dr. Hill's opinion as to the probable pressure in the arteries where they enter the eye. [Dr. Hill: You may take it as 100.] Taking the pressure as 100 where the blood enters, and at 25 where it leaves the eye, there is a fall of 75 mm. Hg. Where did this fall take place? It was probably not very sudden. It was important to remember the laws governing the pressure of a fluid moving through a tube. In a horizontal tube of uniform calibre the pressure falls continuously and evenly throughout. In a tube of varying calibre it is modified, and in places the fall may be converted into a rise. Where the tube is larger, the fluid moves more slowly, making less pressure in the forward direction and more against the containing wall; where it is smaller the fluid moves more quickly, the forward pressure is greater, the lateral pressure less. In a vascular area like that of the uveal tract, the aggregate transverse section of the capillaries were greater than that of the arterioles feeding them, and this ensured a slower movement and a greater pressure in the capillaries than would be present if the transverse sections were equal; the pressure might even be greater than that in the arterioles. Professor Starling had pointed out that the capillary wall was thick enough to support such pressure, and had shown reasons of a different kind for assuming that the capillary pressure must be considerably higher than the chamber pressure—perhaps as high as 60 mm. Hg.—in order to produce the intra-ocular fluid.

It was generally stated that the ciliary processes provided the intra-ocular fluid. He thought it better to say the ciliary *body* so as to include the *pars plana.* The processes were obviously fitted by structure and position to supply the aqueous chamber; nearly the whole of their surface was in open communication with it. The *pars plana* was in intimate relation with the vitreous body. It was thickly studded with the "glands" of Treacher Collins. It was readily reached by staining fluid injected into the vitreous. Morbid exudation could frequently be traced from the *pars plana* into the vitreous. It seemed probable, therefore, that this part of the ciliary body secreted the fluid of the vitreous.

The tension of the eye was maintained by the intra-ocular fluid. The term "intra-ocular tension," often used by writers, was apt to confuse. We ought, he thought, to speak of the tension of the tunics and of the pressure within the eye—or of the ocular tension and of the intra-ocular pressure.

It was sometimes stated that the wall of the eye was practically a rigid case. This was misleading. The tunics were pliable, distensible, and elastic. When a finger was pressed upon the eye the wall was dimpled; the fluid displaced by the dimple was found room for elsewhere. When the finger was removed the dimple disappeared. This proved the distensibility and the elasticity of the tunics. Accurate measurements had been made to ascertain the amount of distension which occurred under a given increase of the intraocular pressure. Errors easily arose through lack of clear perception of such points. For example, it had been contended that increase in the tension of the eye was due to an increase in the pressure of the contents and *not* to an increase in their volume. But the two things are inseparable. An increase in the tension of the eye indicates an increase of the intra-ocular pressure, and it also indicates an increase in the volume of the contents, for neither can occur without the other.

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ORIGINAL ARTICLES.

REMARKS ON HOLES IN THE MACULA LUTEA AND FOVEA CENTRALIS WITH THE REPORT OF A NEW CASE*.

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Herman Knapp, as the first, saw in 1869 as described in the Archives of Ophthalmology, Vol. I., p. 177, with the ophthalmoscope in an eye which had suffered a severe contusion besides several isolated ruptures of the choroid, a peculiar change in the retina which was localized exactly in the macula lutea. It was characterized by a round red spot which he at first considered to be a retinal hæmorrhage. The further and clear description of the later ophthalmoscopic changes in this spot, make it all but certain that this was the first case in which a hole in the macula lutea was seen ophthalmoscopically.

Since that time a comparatively large number of authors (Noyes, Loomis, Kuhnt and Haab, Fuchs, de Schweinitz, Zentmayer, Reis, etc.) have described cases in which they made the ophthalmoscopic diagnosis of a hole in the macula, which, however, never came to a microscopical examination.

From a review of these cases it is evident that we must differentiate between cases in which the hole formation is found in connection with other affections of the eye and, so to speak, spontaneous,—and cases in which the formation of a hole followed a trauma whether this was simply a contusion or a perforating injury.

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*Read at the meeting of the St. Louis Ophthalmological Society, March 24th, 1913.

In a certain, but much smaller number of cases a hole in the macula or fovea centralis has been found on microscopic examination, in which an ophthalmoscopic examination or diagnosis had previously not been made (as, also, in two of my cases).

The first one of these is probably the one pictured in Pagenstecher and Genth's Atlas of the Pathological Anatomy of the Eyeball on Plate XXV. Among others, the pathology of holes in the macula has more recently been studied by G. Coats who, in 1907 in the Royal London Ophthalmic Hospital Reports, published an excellent paper on this subject with beautiful illustrations, giving the microscopical findings in four cases in which no previous ophthalmoscopic examination or diagnosis had been made.

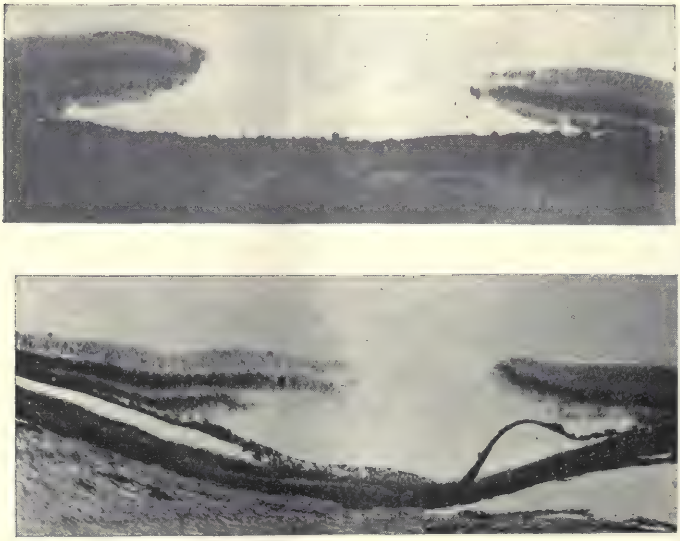

Fig. 1.

Since then a number of similar cases have been described by others. Parsons (Pathology of the Eye, Vol. IV., p. 1365) describes a hole in the macula of an eye of a child afflicted with amaurotic family idiocy in which the hole was evidently due to the congenital absence of the nerve fibre layer.

The first case in which a macular hole had been seen with the ophthalmoscope and in which this condition was verified by the microscopical examination was the one of which it was my good fortune, in 1908, to show you at first the macroscopical appearance and later on the microscopic sections. As you, perhaps, remember, the case—one of a bullet having passed through the orbit into the brain,—had been seen by my friend, the late Dr. Ch. J. Kipp, who enucleated the eye four days after the injury had been received and sent it to me for microscopic examination. It is described in the AMERICAL JOURNAL OF OPHTHALMOLOGY, Vol. XXVI. p. 225. A photographic illustration of it appeared on page 353 of the same volume. See Fig. 1.

In 1911 Fuchs published a paper on holes in the fovea centralis (Lochbildung in der Fovea centralis. Von Graefe's Archiv fuer Ophthalmologie, Vol. LXXIX. p. 42).

In this paper he reports two cases of holes in the fovea centralis. The alterations which he describes were found during the microscopic examination of two blind eyes without a preceding ophthalmoscopic diagnosis. The conditions he found and which prompted his paper materially differ from what had been previously seen in such cases. In the one eye the hole in the fovea—if it ever had existed—was at the time of Fuchs' examination filled with what he considers a newly formed tissue, so that there was no longer a gap; in the other eye Fuchs speaks of a marked "thinning out of the fovea" after a contusion of the eyeball. In the illustration to this case the abnormal fovea appears considerably thicker than it should be. Therefore, in this case, too, a newformation of tissue must have occurred, although there seems to have been no real hole.

Though these two were certainly not typical cases, in so far as there were no holes present in the fovea when Fuchs examined and described them, Fuchs in summing up the typical cases rejects the case of Parsons and the one Kipp and I had examined as differing from the usual ones, because, as I myself had already stated, the hole in our case may, perhaps, have been due to a direct rupture of the retina in the macular region when the injury was received as the eyeball was scraped by the bullet which tore the optic nerve on its passage through the orbit. Why a manifest hole in the macula lutea which had been seen, two days after the injury was received, by means of the ophthalmoscope and which in the microscopic section can be easily seen with the naked eye, since the edges of the retina are fully 1 mm. apart, should not be looked upon as belonging to the typical class of cases, more especially because its edges were still ragged and had not had time to become smooth, I fail to understand, excepting for the fact that, unlike all the other reported typical cases, it had been seen both ophthalmoscopically and microscopically.

I, also, cannot understand, how C. A. Clapp in an article on macular holes in the February, 1913, number of the *Ophthalmic Record* (p. 83) could make the following statement about this case: "The eye was enucleated and examined by Alt who found a depression at the macula which he *called* a hole at the macula"!

Yet, the hole at the macula in this case, as you again see from the specimens and photographs passed around, remains a hole at the macula, typical like all the others that have been reported.

Since this is to this day, as far as I know, the only case in which a macular hole had been seen with the ophthalmoscope and the diagnosis was confirmed by the microscope, it is in my humble opinion the most valuable of all the cases on record and should be regarded as such.

It is rather queer that the histological appearances in this case agree so fully with those of Coats' second case (Fig. 4) that it might appear as if his and my sections were made from the same eye.

In 1911 (AMERICAN JOURNAL OF OPHTHALMOLOGY, Vol. XXVIII. p. 161) I had occasion to describe a second case of this kind, although in this case the hole concerned probably the fovea centralis only and was so small that it could not have been recognized with the ophthalmoscope. Strange to say, as you see from the photograph, this hole in the fovea is almost exactly like the one depicted in Coats' Fig. 6. There had been no injury and I enucleated the eye on account of a sarcoma of the iris and it showed other pathological conditions as I have described in my article.

In trying to explain the causes for such hole formation in the macula or fovea based on an analysis of the then published cases Fuchs mentions:

"1. Spontaneous inflammation of the whole eye without perforation like iridochoroiditis, or the retina alone, like albuminuric retinitis and neuroretinitis.

2. Disturbances in the nutrition of the retina as in pigmentary retinitis, in familial amauritic idiocy, in arteriosclerosis, or after the use of X-rays.

3. Detachment of the retina.

4. Perforation with subsequent inflammation through an injury, operation (discission, cataract extraction) or a corneal ulcer.

5. Contusion without perforation. *This is the most frequent cause* of hole formation.

6. In some cases the cause remained unexplained. In old people senile changes might be thought of."

To these we now must add: 7. An intraocular tumor (my second case).

Coats concludes, as Reis had done before him, that:

"Macular holes are produced by an œdema of the retina at the posterior pole. The œdema may not be confined to the region of the fovea, but the appearance of a hole will only be produced if there is a defect at least of the inner layers of the retina. Possibly for the completely typical picture without membranes or shreds, a total defect of all the layers of the retina is necessary. The œdema may result from a contusion, in which case it is the same as the œdema which produces Berlin's opacity; or it may arise from toxins in the vitreous, the result of iridocyclitis; or from retinal vascular disease."

He then adds: "Rupture of the retina at the time of injury is *not* the cause of macular holes."

It is, of course, impossible to state with absolute certainty that in the case described by Kipp and myself the macular hole was due to such a rupture *at the time* of injury, yet it seems quite likely, since as stated it was observed on the second day after the injury had been received and the eye was enucleated on the fourth day.

The statement which Coats makes must, therefore, it seems in the light of our case, be modified.

There seems to me, also, to be a difference between a large hole which comprises the whole macula lutea as in a case of Pagenstecher and Genth, the one of Coats' and ours, and perhaps, some others, and a hole which only concerns the fovea centralis as in one of Coats' cases, perhaps in one of Fuchs' cases and in my second and third case. Perhaps a tear in the macular region is necessary in the former cases, while in the latter, perhaps an œdema is sufficient to produce the lesion.

In my second case, as you see from the photograph, there was comparatively little evidence of œdema, yet there is still a small amount of exudation lying between choroid and retina, and in the gap. This exudation had a slightly bloody tint. There was probably some hæmorrhagic effusion in the history of this case.

I am now in a position to report to you a third and most interesting case.

Through the kindness of Dr. M. Wiener, of this city, I have recently come into the possession of an eyeball which he had enucleated. The histological findings in this case appear to be of especial interest in that they seem to show clearly that an œdema alone can be and perhaps is responsible for the formation of a hole in the macula, as Coats and others have assumed.

The following history was kindly furnished by Dr. Wiener: "A. A. D., 14 years of age, while holding a cap (dynamite?) before a stove, was injured in the left hand and in the left eye by an explosion on October 29th, 1912.

I first saw the patient at the Hospital in the afternoon of October 30th. There was a penetrating wound of the left eye just above the corneal margin in the vertical meridian. The wound was clean cut and about 1.5 mm. long. The iris was caught between the wound lips, but was not protruding. The pupil was contracted. The vitreous body was fairly clear so that the path of a foreign body could be traced in it in a down and outward direction. The foreign body, however, could not be seen. Atropin 1 per cent. instilled 3 times daily.

On November 1st, there was very little irritation and the pupil was dilated. The patient was given an injection of antitetanic serum. He left the hospital and was ordered to report at my office the next day.

He did, however, not appear until November 4th. Now, even by ordinary daylight a small bright metallic particle, looking like burnished copper, could be seen suspended in a strand in the vitreous body. With the ophthalmoscope another still smaller particle could be seen further back. The larger particle appeared flat, nearly 2 mm. in diameter, rather rhomboid in shape.

On November 5th the patient was placed before a giant magnet, but the result was negative.

On November 11th, under general anæsthesia, I attempted to extract the foreign body with forceps. Although I could see it plainly, it again and again eluded the forceps which in its stead only grasped the slippery vitreous body. Finally so much blood had accumulated in the anterior chamber that further attempts appeared useless and the eye was enucleated. The healing was uneventful."

The well hardened eyeball was cut in to an anterior and posterior half for examination. The region of the wound and the general conditions of the eyeball presented nothing of especial interest either macroscopically or microscopically. An exception is made by the region of the macula lutea. This part of the retina on macroscopical examination appeared somewhat swollen and protruded into the vitreous chamber, thus inviting a special examination which, it seems to me, proved to be exceedingly valuable in its results. See Fig. 2.

On microscopical examination this localized swelling of the macular region appears to be solely due to an œdema confined to this particular part of the retina.

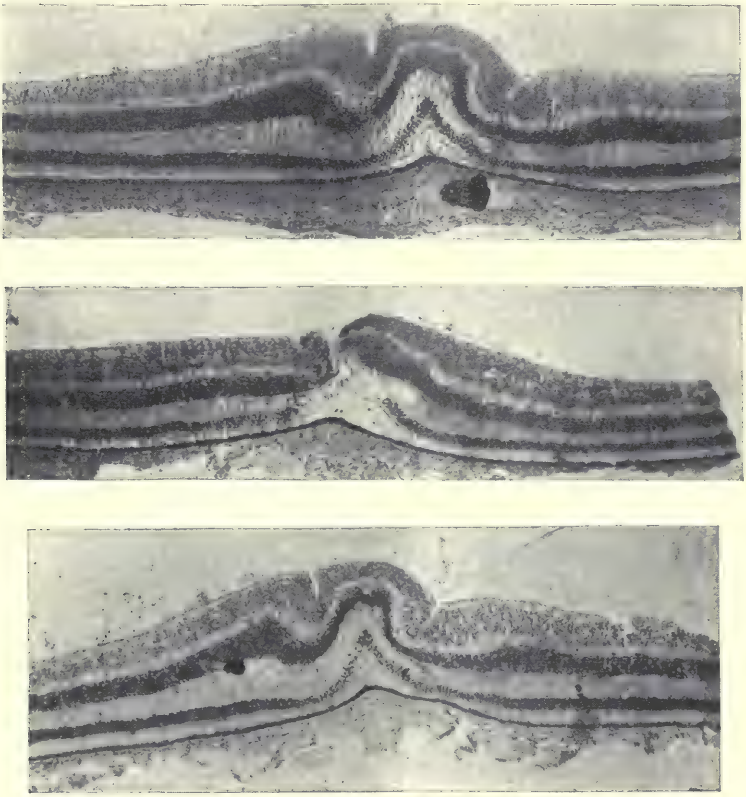

Fig. 2.

The choroid is hyperæmic throughout, but perhaps more particularly so behind the macula lutea, at least it is thicker here, and projects somewhat into what Schaefer termed the outer fovea centralis.

The considerable swelling and folding of the retina is plainly seen to be due to the formation of numerous cavities between the fibres and cells chiefly of the outer layers of the retina which, however, do not resemble the spaces found as a rule in the periphery of the retina (Ivanoff, Blessig) and those drawn in two of Coats' cases. On account of the early enucleation there has been no time for sufficient destruction of the tissues to produce such comparatively large cavities. These cavities have in life undoubtedly contained some fluid which has produced the swelling and the formation of several folds and pressed the fovea and macula inwards towards the vitreous body.

When viewing the different layers of the retina in turn from the outer to the inner surface we find the following conditions: The cells of the pigment epithelium appear frayed on their inner surafce as if they had been pulled inward after having been previously adherent to the retina. The structure of the cones has disappeared and in their place there is a mass of wavy threads which are separated by cavities, and instead of pointing outwards toward the pigment epithelium, have been drawn or pushed inwardly in such a manner that their formerly outer ends now meet and form a wavy line running at right angles to the surface of the choroid forward towards the inner layers. In the same manner the outer limiting membrane appears like a wavy thread and forms a sharp angle towards the outer nuclear layer. This angle is repeated by the nuclei of the outer nuclear layer which are reduced in number, altered in shape

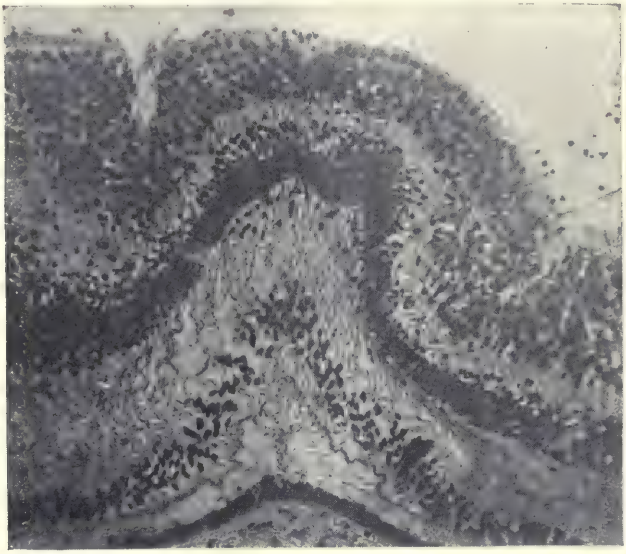

Fig. 3.

and separated from each other. The largest amount of exudation seems to have been lodged in the outer plexiform layer between Henle's fibres. There has been considerably less exudation in the inner nuclear and inner plexiform layers, and hardly any in the ganglion layer. See Fig. 4.

These changes together with the swelling and folding of the tissue of the macula were due to the œdema which is represented by innumerable microscopical cavities in these layers. It is not unlikely that this condition in reality corresponds to the œdema sometimes seen in the macular region after contusions and which has been so exhaustively studied by Berlin. The only discrepancy I can see, lies in the fact that Berlin's œdema usually disappears in a week or so without leaving a trace.

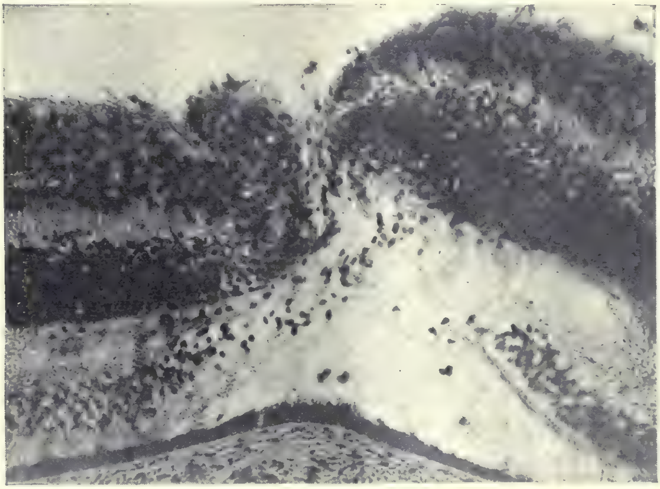

FIG. 4.

Yet, a hole in the macula lutea has been seen to develop later in just such cases. And this renders our case the more interesting, since in several sections through the fovea centralis the œdema has evidently produced a minute hole in the tissues which later on might have led to a plainly visible hole formation.

At that particular place, again viewing the retinal layers from without inward, we find the cones gone altogether. There is, also, a gap in the outer limiting membrane which here on the peripheral side forms not a wavy line as we saw in more peripheral parts of the macula, but a straight line bent inward, showing that it had been stretched considerably before rupturing. On the side toward the optic papilla it cannot be made out and must have been torn away or become perfectly disintegrated.

There are few nuclei of the outer nuclear layer and they together with some detritus and a larger mass of nuclei of the inner nuclear layer are in the act of being forced through an opening in the inner plexiform, the ganglionic layer and the limitans interna. This latter membrane forms a wavy line in the neighborhood of the hole and some extruded nuclei lie upon it. See Fig. 4.

The picture is such that it impresses one at once with the idea that the œdema having caused an amount of pressure and consequent destruction of the tissue elements which they could no longer withstand had finally suddenly burst through an opening in the inner layers and the inner limiting membrane, and that the current of the liberated fluid had drawn nuclei and fibres in its course inward towards the vitreous chamber. That the hole is not clean cut as it appears in older cases is, of course, perfectly natural, as the partly destroyed parts have not yet been shed and absorbed, nor has there been time for the formation of scar tissue.

Just outside of the macula the retina assumes its normal appearance, even the rods and cones show no pronounced pathological changes. This is the case in the direction of the optic papilla as well as in the direction toward the periphery of the retina.

It seems from this specimen, which evidently represents a very early stage of the formation of a hole in the fovea centralis, that a high degree of hyperæmia of the choroid may with the aid of some mechanical or chemical influences lead to a localized œdema in the macula lutea and its nearest surroundings which, if it persists long enough, may lead to a rupture of the inner layers and the inner limiting membrane and thus may cause the formation of a hole. It may seem doubtful that such a process alone would account for as large a macular hole as Pagenstecher and Genth, Kipp and myself and Coats have found, although there is nothing to prevent a small hole in the fovea centralis from growing into a larger one in time.

THE REPORT OF A CASE OF SYMPATHETIC OPHTHALMIA, DEVELOPING SEVEN DAYS AFTER OPERATION. TREATED BY NEO-SALVARSAN; RECOVERY.

By F. Phinizy Calhoun, A.B., M.D.,
ATLANTA, GEORGIA.

The recovery of a case of sympathetic ophthalmia with useful vision, is by no means a common occurrence; the rapidity of onset, the treatment with salvarsan and the other phases, make this case one of unusual interest.

B. S., a fairly developed collge boy of 21 years, consulted me September 10, 1912, on account of bad sight in the left eye, and principally of the advisability of having an artificial pupil made, having been treated and urged by a competent ophthalmologist in a distant city that such a procedure was possible and advisable.

Family history: One uncle has arthritis deformans, and most of his immediate family complain of rheumatism.

Past history: Patient been well and healthy except for attacks of rheumatism and tonsillitis. The right tonsil was removed some years ago, the left is now enlarged and constantly inflamed. Patient says his mother keeps a good table, that the family eat heartily and he especially of meats. He had iritis in the left eye in 1908 from which he recovered with some vision. Two years later a second attack, in 1911 a third attack in the same eye. Patient admits that the first attack was not treated until two weeks after onset. He has been under medical advice until a few days before consulting me and was advised that an operation for an artificial pupil was indicated for the left eye, which was blind.

Examination.—Right: vision 20/15 with a —.50⌒—.50 ax. 135=20/15 under homatropine. Fundus normal, except a small atrophic spot of choroiditis between the papilla and macula and about one-fourth the size of the papilla. Tension normal. Left: occluded and secluded pupil, iris bombé, tension slightly minus, good perception of light. Exterior of eye normal and no injection of globe.

An iridectomy was advised but not for visual purposes, as it was my intention to remove the iris in the upper segment. The patient and his father well understood the reasons for an operation and I even ventured a warning that at some later day the eye would undoubtedly require an enucleation.

The operation was performed the same day, but on account of a very unruly patient, besides an iris bound by adhesions to the anterior surface of the lens, a very incomplete and unsatisfactory iridectomy was made. The following day the chamber was restored, and I could easily detect a slit-like opening in the iris. There was very little reaction to the globe and the patient felt comfortable. I ordered atropine solution, potassium iodid and mercury in appropriate doses. The next day the iris looked muddy and continued so. Seven days following the operation, he complained of the light hurting the *right* eye, and noticing some engorgement of the deeper vessels, I dilated the pupil again and found about 15 small round precipitates on the posterior surface of the cornea; no other new change noticed in the fundus. Undoubtedly this was a beginning sympathetic ophthalmia.

I explained the gravity of the situation to the young man and communicated with his father over the long distance telephone, and within half an hour the left eye had been enucleated and active treatment begun on the right eye. He was placed in bed in a dark room and ordered for the eye constant hot bathing, atropia, dionin, and internally soda salicylate, mercury, potassium iodid and hexamethylenamine. Day by day the eye grew worse. The sclera became more injected, the vitreous more hazy and the retinal veins tortuous and dilated, but fortunately the patient suffered no pain.

As the treatment did not seem to check the progress of the disease and as the dosage was very unsatisfactory on account of a delicate stomach, I decided to have given 7/10 gram of neo-salvarsan, notwithstanding a negative Wassermann made a few days before. This was 16 days after the iridectomy, and 9 days after the enucleation. For the following four days the engorgement increased and sight rapidly diminished. Then the height of the disease seemed to have been reached and slowly for ten weeks was the eye clearing, and when dismissed, December 22nd, with the refraction corrected there was 20/40 vision. In communications received since, the patient thinks his vision is much improved.

Alterative treatment was continued after the intra-venous injection of neo-salvarsan, yet at no time could the patient tolerate more than 30 drops of a saturated solution of potassium iodid at a dose, and 2 drams of the inunction of mercury a day.

The salicylate of soda could not be increased beyond twenty grains and hexamethylenamine was given in average doses.

In conclusion, the case presents three important facts:

(1) Sympathetic ophthalmia developed in seven days. Whether there were latent toxines or bacteria present in the sympathetizing eye, which were aggravated and made active by an operation on the sympathetic eye, we cannot say. There were certain evidences of this, if we consider the atrophic area of choroiditis observed before the operation. Although in recovery, this spot has not apparently increased in area or changed its appearance.

(2) The arsenious preparation used, when the case seemed helpless and all drugs seemed useless, apparently had some power in controlling the disease. I am aware that it might have been given at the very turning point or crisis in the disease and its effect overestimated. I feel sure that should I have under my care another case of sympathetic ophthalmia, I would be justified in giving an initial dose and would be tempted to repeat it.

(3) A complete and uneventful recovery.

PARINAUD'S CONJUNCTIVITIS.

R. Argañaraz (*Semana Medica,* April 4, 1912) expatiates on the necessity for differentiating the conjunctivitis described by Parinaud from other forms of conjunctivitis, stating that it is not contagious, and that it is impossible to reproduce the affection in animals. In man it runs a relatively mild course, healing in from seven to ten months without leaving any trace. The cornea and the lacrimal passages persist intact throughout its entire course. The assumption of an animal origin is problematic, he continues, and the affection is not tuberculous. The chief characteristics are the inflammation and granulations, the swelling of the lids, the infarct in the lymph-nodes and the fever and anorexia—no other form of conjunctivitis combines these four groups of symptoms. Diphtheria antitoxin injections seem to modify favorably the primary stage of the disease, but he warns expressly against cauterization of the granulations as this is liable to leave complications in the cornea while, left alone, the lesions subside in time completely. The *Bacillus xerosis* seems to have something to do with the affection. He reports in detail three cases in children and one in a brother physician.—*Jour. A. M. A.*

A PROTRACTOR FOR USE WITH THE SINGLE CELL TRIAL FRAME.*

By A. E. Ewing, M.D.,
ST. LOUIS, MO.

A departure from the heavy thick edged mounting for trial lenses, such as is found in the older trial sets, was first suggested by Dr. John Green before the American Ophthalmological Society in 1878. Two years later he exhibited at the same Society "two metric trial cases," one made by Mr. H. W. Hunter of New York, and the other by Messrs. Jas. W. Queen & Co., of Philadelphia, with settings having thin flanges so constructed that two lenses could be placed face to face in the same cell of a trial frame. With this mounting the strongest spherical and cylindrical lenses could readily be used in combination, with their optical centers as nearly approximated as was possible for double convex or double concave lenses, except by having their surfaces in actual contact. He also exhibited a trial frame with three grooves, each of which would hold two lenses, the three grooves having the capacity to carry six trial lenses.

Seven years later, also before the American Ophthalmological Society, Dr. Edward Jackson presented a trial set of plano-spherical lenses so arranged that two lenses could be placed in the same cell of a trial frame for trial purposes; but the lenses were 25 mm. in diameter, instead of the regular standard size, this smaller diameter having been chosen to reduce the weight of the trial lens, while the selection of the plano surface had for its purpose the reduction of the spherical aberration.

Appreciating at once the practicability of this fundamental principle with regard to spherical aberration advanced by Dr. Jackson, Dr. Green had several small sets of full sized trial lenses with the thin flanged rims and the plano lenses manufactured for his own use by Wall & Ochs, and in 1893 a complete case to 24 D. for myself, all the lenses being plano that were stronger than 6 D. These weaker lenses are cheaper than the plano lenses of the same focal length, their aberration is inconsiderable, and their slight curvature is sufficiently protected by the necessary thickness of the flange to prevent their surfaces from being in actual contact.

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*Read before the Ophthalmic Section of the St. Louis Medical Society, March 5th, 1913.

Previous to receiving this trial case I had depended on one in which the mountings were of the Nachet type. For the manipulation of the cylinders it was necessary to employ the ordinary revolving trial frames, which are usually arranged to carry several lenses face to face. With the new thin flange mountings it was possible to find single cell trial frames into which a spherical and a cylindrical lens could be placed face to face. This saved the weight of the heavy revolving frames, besides rendering it possible to employ in the examination quite exactly the lens which would be worn in the future, both in respect to the position of the lenses with reference to one another, and in the matter of the position of their newly formed combined lens with reference to the distance from the patient's cornea.

To facilitate the employment of these single cell frames for this purpose, Mr. Erker, of the Erker Bros. Optical Co., kindly enlarged the grooves so as to more readily accommodate the two lenses. This, however, was a difficult task, as the steel proved to be very hard, and it resulted in his prevailing on the American Optical Co. to make a die for the widened groove. Since then such frames have been readily obtainable. Also, within the last few years, Dr. Green has induced the American Optical Co. to manufacture the thin-flanged rim as a part of their regular stock, which renders it easy to obtain lenses with this mounting in large or small quantities.

As these light single cell trial frames lack the degree markings for establishing the axis of the cylinder, it became necessary to depend on an ordinary protractor for this purpose, and the protractor being cumbersome I constructed a diagram based on the diagram for spectacle prescription blanks, which is shown on page 516 in the Reference Hand-Book of Medical Sciences, 1888, in the article on Spectacles, by Dr. Green, placing the 0 at the top of the circle in the vertical meridian and employing the + sign in reckoning to the right and the — sign in reckoning to the left, the method employed by Dr. Green in his clock dial astigmatism chart, and which may also be found on Snellen's Astigmatism Chart, Graefe-Saemisch, 1874, Vol. III. p. 82. This diagram consisted of two circles made up of short radiating meridional lines with five degree intervals, each ten degree interval being represented by a line two millimeters long, and the alternating interval by a line one millimeter in length, the proximal end of each of these lines resting on an imaginary circle exactly the size of the thin-flanged lens mounting. The circles were placed twenty-one millimeters apart, with their horizontal meridians in the same line, and at their upper margins a dotted line was drawn tangential to both circles. The forty-five degree meridians were represented by lines four millimeters long. To aid further in the accuracy of adjusting the rim to the circle a cross was placed at the center of each circle made of vertical and horizontal lines five millimeters long. The circles were designated by R for *right* and L for *left,* the latter corresponding to the left eye and the former to the right, as the lenses are worn by the patient.

To employ the diagram with the single cell trial frame it was only necessary to place the cylinder of the right eye over the right circle, with the edge of the trial lens of the left eye against the tangent of the left circle, and note the position of the usual short marginal guide line, which indicates the axis of the lens, in degrees on the circle. For the left eye the lens was placed over the left circle with the edge of the right lens against the tangent of the right circle, and the position of the left lens was similarly noted in degrees. This diagram was printed on the prescription blank for the glasses in order to have it always at hand and ready for use. It has proved to be a rapid, correct and satisfactory method for noting the axis of the cylinder when writing the record of the case, and for indicating it with a pen or pencil mark on the diagram for the use of the optician, as it plats the axis of the cylinder or the prism precisely as it is to be worn by the patient.

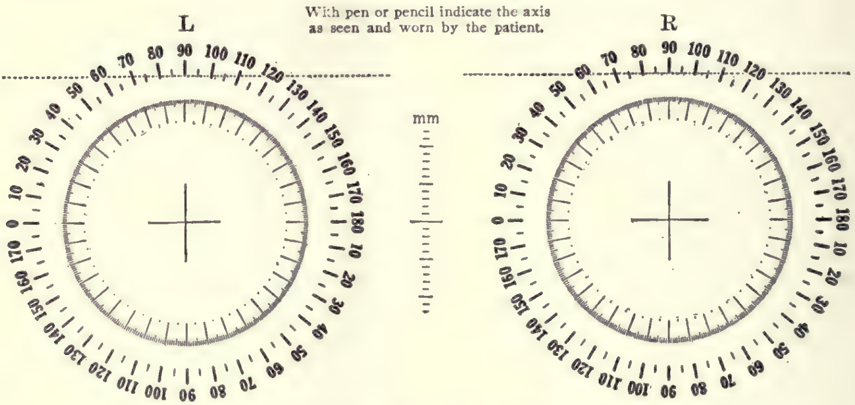
With pen or pencil indicate the axis as seen and worn by the patient.

Fig. 1. A protractor for use with the single cell trial frame.

In the newly constructed diagram here presented, Fig. 1, which is intended to be employed in the same manner, these two principal features, the tangent lines and the two circles of the size of the rim containing the trial lens, are preserved. It is further elaborated by showing the divisions in degrees and by the addition of both an outer and an inner circle, the former a little larger and the latter a little smaller than the rim of the trial lens, the lens being more readily centered by having this narrow light space between the rim and the short radial lines which make up the circles. This same space must be allowed between the rim of the lens of the fellow eye and the tangent of its circle. Also the conventional angular notation generally adopted in the graduation of circles has been restored, as used by Donders, and still in use by probably the majority of ophthalmologists and opticians. As only the one hundred and eighty degrees are necessary for establishing the axis, the numbers are duplicated in the lower half of the circle in order to facilitate the reading.

Another valuable innovation that is being carried out in the cylinders and prisms of the newer trial lenses is the abandonment of the ground glass margins, which are ordinarily depended on for the general direction of the axis, and the employment only of engraved or etched lines near the rim to mark the axis. The ground glass margins tend to disturb the accuracy of the examination by being noticeably in the visual field, and in this way exciting accommodation. Should the lines indicating the axis of the lens not be true with one another, or if these lines are not properly centered in the mounting, the defect is readily detected by this protractor.

CORRECTION.

In the table of values at the bottom of page 70, March number of this JOURNAL, the decimal point should be one place to the right of its present position, so that the values of MO would be: 0.3492 cm; 0.6984 cm; 1.0482 cm; 1.3986 cm; 1.7498 cm; 2.1020 cm; 2.4556 cm; 2.8116 cm; 3.1646 cm; 3.5266 cm.

MEDICAL SOCIETIES

OPHTHALMIC SECTION,

ST. LOUIS MEDICAL SOCIETY.

Meeting of January 8, 1913.
Dr. C. Loeb in the chair.

Report of Cases.—By Dr. Clarence Loeb.

I have two patients whom I desire to present this evening. (1) C. B., male, a carpenter, while hammering a nail on January 3, 1913, was struck in his left eye. He is positive that it was the entire nail and not a piece of it or of the hammer which struck him. He was not rendered unconscious by the blow, but couldn't see with the eye afterwards, although his vision had been good previously. I saw the patient for the first time on January 6th, at which time there was circumcorneal injection, an incised wound of the cornea and a contracted pupil, with some pain. After the pupil had been dilated, it was possible to see the lens. The anterior capsule was intact, but the lens substance showed a number of opacities, arranged in a circle, very similar to those of a beginning senile cataract, but not so far peripherally. They have become larger in the few days he has been under my observation. I have not been able to obtain a view of the fundus, but do not believe there is a foreign body in the eye. I present the case because of the very pretty picture it affords of of a beginning concussion cataract.

The second patient, Mrs. E. S., aged 54, whose vision has been steadily decreasing for two months, without any pain or other symptoms. The left eye was especially involved. I saw her first on December 12, 1912. V.R.E.=1/15 increased to 1/6 by addition of +1.5S. V.L.E.=less than 1/30; no improvement by glasses. Fundus examination under homatropin; right eye shows a dark area in the macula, but no actual retinitis. However, above the macula and rather toward the disc, is an arc of 6 to 8 white dots, which are evidentally the product of a retinitis. No hæmorrhage. L.E.: In the macula is a large, oval white plaque with a small amount of pigment above and below. Examination of the urine showed no albumin nor sugar. This examination was repeated to-day with the same result. No luetic history could be obtained and the Wassermann was negative. However, under the administration of K.I. the vision has increased to —V.R.E.=6/20, with +1.5S., V=6/15 nearly. V.L.E. 1/20 with +1.5S, V=1/20+. The exact diagnosis is in doubt, except for the diagnosis ex juvantibus of retinitis luetica.

DISCUSSION.

Dr. Jacobs: I merely want to say that in a recent issue of the *Klin. Woch.*, there appeared a paper on "Retino-choroiditis" (Jensen) in which the author describes a condition which bears some resemblance to what we have seen here to-night. It strikes me that the location of these retinal lesions would possibly be in line with the condition described in this paper. The writer reviews the entire literature of this subject and reports 17 cases; he describes lesions which resemble, to a certain degree, those seen in this patient. Their location particularly is what impresses me as being similar. I would suggest that the matter be further looked into. The writer brought out the fact that no luetic or tubercular basis could be found. However, in his conclusion he concedes that when he finished he knew as little regarding the ætiology (excepting the facts just mentioned) as when he started. He also mentions the fact that recurrences, which were frequent, usually come at the site of the former lesion. It would be interesting to know, if this patient can be kept under observation, whether any recurrence takes place after these lesions clear up, and whether the conditions possibly belong in the category, retinochoroiditis (Jensen).

Dr. Green: Although this case does not have the clinical appearance of tuberculosis of the retina, I would suggest the diagnostic injection of tuberculin.

Dr. Loeb, in closing: This case was in a way similar to the one I presented about two months ago—a case which had the same character of white dots in the retinæ, but much more pronounced than in this case. They formed a complete circle around the macula, which was unaffected.

Equivalent Values in Spectacle Lenses.—By Dr. W. E. Shahan.

Practically all the text-books on ophthalmology treat the subject of lenses and the properties of lenses in quite a superficial manner. All distances are measured from the center of the lenses and all lenses are considered without thickness. Moreover, lens grinders and spectacle salesmen compute the powers of lenses in a simple arithmetical way. A lens with a plus 20 D surface on one side and a minus 10 D surface on the other is a plus 10 D lens, and such a lens will be practically neutralized by a minus 10 lens held against its convex surface. But if such a lens is prescribed for a patient whose hypertropic or aphakial defect is accurately measured by a plus 10 double convex lens, it will be found that the defect is over-corrected by about 2 diopters. This plus 10 meniscus lens has, therefore, an equivalent value of 12 diopters (for Bausch and Lomb glass where the refractive index of the Fraunhofer ray D is 1.5225, and ground with Bausch and Lomb tools, and the greatest diameter of the lens is 40 mm.).

The simple rules which hold well enough for double convex and double concave lenses, fail increasingly with increasing power and change in form. This was shown to be due to two prominent factors: advancement of the second Gaussian point along the axis of the lens in a direction away from the concave surface in collective lenses,—and to absolute increase in power (of collective lenses) with increasing change in form. This was illustrated by diagrams and formulæ. And the "equivalent value" of a double convex lens in terms of a meniscus lens was defined as that double convex lens which, when put into the same rim as that which held the meniscus lens, brings parallel rays to a focus at the same distance from the plane of the rim as the meniscus does. It was shown that all equivalent values could be accurately computed and charted so that when the usual defect is accurately measured with double convex or plano-convex lenses, the value of any corresponding meniscus can be read off without the labor of tedious computation. Such work is now being carried out and will be available in two or three months. The logarithmic computation is tedious and at least this much more time will be required for its completion. A method of computing the thickness of any double convex or meniscus lens when the diameter and radii of curvature of the two surfaces are known, was also explained in detail.

It will be realized at once from the above statements, that when visual defects are measured accurately with double convex or plano-convex lenses and the glasses are ordered in meniscus or toric form, the result will be an over-correction which will be small for weak lenses and increase to amounts which cannot be neglected as the lens becomes stronger. It is to render available for immediate practical use the advantages of diminished astigmatism of oblique pencils and flatter fields that graphs of equivalent values in spectacle lenses are being prepared. The intention is to prepare these for Bausch and Lomb glass where N D= 1.5225 and for American Optical Company glass where N D= 1.507, and arrange formulæ for making the same calculations for any other variety of glass of which N D is known.

It was also shown that meniscus lenses, equivalent to double convex lenses, have telescopic properties which the double convex lenses in the ordinary position do not have. It thus happens that the visual acuity measured accurately with double convex lenses is somewhat greater with the corresponding equivalent meniscus or toric lenses, because of telescopic magnification. Emphasis was laid upon the fact that the ordinary neutralization test fails to discover these discrepancies in equivalent values.

DISCUSSION.

Dr. C. Barck: This paper by Dr. Shahan interested me very much, and I want to congratulate him; more especially so, because mathematical subjects are rarely brought before this section.

His calculation of the thickness of a lens from the two known quantities, namely, the radius of curvature and the diameter of the lens, is very clever. And in lenses of higher degree their thickness is no negligible factor, as is well known.

In regard to the second part of his paper, I beg to differ somewhat. It seems to me that he approached the subject from an erroneous premise. When calculating the respective foci from the positive and from the negative surface of a meniscus, he measured from the base-line (referring to the drawing) and proved that there was a difference. But if you measure from the center of the meniscus, as measured in the case of the biconvex lens, or if you place the meniscus upon the base-line, there will be no difference. In other words, the difference in focus is no inherent quality of a meniscus, but depends on its location. If I understood the tenor of Dr. Shahan's paper correctly, he seemed to assume the former.

Whilst dissenting in respect to his theoretical foundation, I fully agree with him as to this fact, that a meniscus, if placed before the eye, gives a different focus than a biconvex lens of the same respective value placed before the eye. (Example: a meniscus with a concave surface of 10 and a convex surface of 21 will have a different focus than a biconvex lens of 11). But the reason for this difference lies in the position of the lens in reference to the eye; the center of the meniscus is more remote from it than the center of the convex lens. If you place the latter further away from the eye, into the position of the meniscus, the focus will accordingly recede; and if you want to retain the first focus with the lens in the second position, you will have to increase its strength. As we are hardly able to change this forward position of a meniscus, it is necessary to bear in mind that a simple mathematical calculation will not do, if we want to substitute a meniscus for a biconvex lens. We must add one to two diopters to the convex surface. Example: Plus 10 is not equivato a meniscus of "minus 6 and plus 16.", but to a meniscus of "minus 6 and plus 17 or 18." The amount of the necessary addition increases the curve proportionately to the increase of the concave surface; if the latter is of small degree, it is a negligible factor; if of high degree, it is very important. The exact amount of the addition in a given case depends upon the nearer or farther position of the meniscus from the eye, and this again depends upon the frame, the configuration of the face, etc. For this reason it is difficult to estimate the exact addition when testing with the frames of our test-cases.

This subject is certainly a timely one; for I believe that frequent mistakes are made with menisci, and furthermore, that we do not make use of them to the full extent of their utility. The only scientific communication which appeared in medical literature, so far as I know, is by Ostwalt. His first article appeared in 1898 and the second in 1900, in Graefe's Archives. Basing his investigations upon the distinctness of peripheral vision, he calculated the best concave surface of the equivalent meniscus for all concave and convex lenses from 1 to 20 diopters. For cataract lenses he found that the best concave surface is one of a minus 11. This would give for a plus 11 an equivalent meniscus of "minus 11 and plus 22" theoretically; and "minus 11 and plus 23 to 24" practically (after the necessary addition, as outlined above). I copied his table, and keep it since then near my test case for ready reference. But there is one difficulty encountered. The opticians are provided by the large houses, like Bausch & Lomb, with two forms of menisci only; the one with a concave surface of minus 1.25 and the other with a concave surface of minus 6.0. The price for these is moderate. All the other menisci must be ground by the optician and the price is rather high, especially for cataract lenses.

"Meniscus" and "Periscopic lens" are synonyma. At present the latter term is more frequently used than the former and older one. Menisci were ground centuries ago by the Venetians, although their qualities were unknown. It was Wollaston, an English physicist, who discovered in 1803 that such lenses give a superior peripheral vision, and he introduced the term "periscopic" lenses for menisci and advocated their use. But his discovery fell into oblivion for a long time, and it is only in the last twenty years that their practical use came more and more into vogue. The mentioned essay by Ostwalt contributed to this.

Lately the firm of Bausch & Lomb sent a chart to many opticians and oculists, which contains three pictures. Uppermost a biconvex lens; then a lens with a concave surface of minus 1.25, which they call a periscopic lens; and finally a lens with a concave surface of minus 6.0, which they call a meniscus. I wrote them a letter and drew their attention to the erroneous distinction between these two terms, which they tried to introduce. Their reply was, that the trade uses these two words in order to distinguish readily the two kinds of menisci, which are in the market. As a matter of fact, it was their firm which introduced the new and wrong definition of these terms into the trade. The question for us is, whether we will submit to the trade and prescribe only the mentioned two forms of menisci (with —1.25 or —6.0), sacrificing thereby our scientific conscience; or, whether we will prescribe the meniscus, which has the best concave surface and force the opticians to reduce the price for menisci ground to order.

As far as the use of menisci is concerned, many points are still unsolved and I am convinced that their usefulness will increase in the future. For this reason I feel indebted to Dr. Shahan that he has brought up this matter as well as for the interesting manner in which he has handled it.

TRANSACTIONS OF THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

January 9, 1913.
Dr. Wendell Reber in the Chair.

[*Continued from the March Number*].

EXHIBITION OF CASES.

The Treatment of Dendriform Ulcer of the Cornea.—Dr. William Campbell Posey.

Dr. Posey spoke of the various types of superficial inflammation of the cornea which were associated with dendriform opacities, and referred to the infrequency of dendriform ulcer in women. He had recently had under his care a number of young men with dendriform opacities, in whom a persistent conjunctivitis apparently played an important part. In the treatment he thought that at first all irritation should be avoided, cauterization of the cornea being only resorted to when the opacity showed a tendency to spread and to resist milder measures. He preferred carbolic acid to other drugs, care being taken to limit the application of the crude acid to the part affected.

Subsequent applications of an ointment containing atropin, iodoform and vaseline relieved pain and promoted healing. He had found holocaine of little value in the treatment of this affection.

DISCUSSION.

Dr. Zentmayer said there is a wider acceptance of the view that dendritic ulcer, herpes cornealis, superficial punctate keratitis and allied superficial forms of keratitis are of neuropathic origin than formerly, but he did not consider the evidence sufficient to include all within this ætiology. As to the treatment, his attention to the value of holocain in these conditions was called some years ago by de Schweinitz's memorandum of the value of this drug in relapsing erosions of the cornea and he has since used it in all corneal conditions, and he thinks with decided advantage combining a compress bandage in some forms. Finding that oil of turpentine next to the solid stick of nitrate of silver was the most efficient treatment for aphthous stomatitis he was led to use it in corneal ulcers and it seems to be of special value in dendriform ulcers. He recalled that in a very pronounced case of filamentous keratitis which had resisted all forms of treatment he had at the suggestion of Dr. Posey employed a strong yellow oxide ointment with benefit.

Dr. Sweet advocated the use of holocain and drew particular attention to the way in which holocain solutions seemed to vary, not only in their anæsthetic properties but in their irritative properties. In his hands some solutions had seemed to be so much more irritating than the average solution that he was led to speculate on whether the chemical itself always came into the market in the same condition.

Dr. Reber also endorsed holocain and was not persuaded that malaria occupied the prominent place in the ætiology of this disorder that was once ascribed to it. Anything which induced a neurotrophic state might well be the cause of the dendriform ulcer of the cornea. In this sense a neighboring dental or nasal disorder might easily prove to be the existing factor.

W. Walter Watson, M.D.,
Secretary.

Meeting of February 13, 1913.

Dr. Wendell Reber in the Chair.

Complications During and After Cataract Extraction.—Dr. William Campbell Posey.

Dr. Posey said that many of the complications which arise may be avoided by the development of skill in operating acquired by practicing upon the eyes of the lower animals, before essaying the extracting of the lens from the human eye. Great care should be exercised in selecting proper instruments. A badly constructed speculum is responsible for many accidents. He preferred the Murdock. The cystotome must be sharp and dislocation of the lens during extraction and subsequent loss of vitreous may often be avoided by a skillful handling of this small but important instrument. He warned against dipping the point of the knife too deep into the angle of the anterior chamber at the point of counterpuncture. A well placed conjunctival flap hastens healing and prevents later complications. Loss of vitreous often occurs from gaping of the wound in consequence of the patient's being directed to look down too far. A skillful and experienced operator will have loss of vitreous in but few cases. He deprecated the performance of the Smith operation on account of the loss of vitreous which it so often entails. He prefers the simplest manner of extracting with iridectomy. While most cases of infection arise from external sources, from germs in the conjunctiva or from unclean instruments or drops, endogenous causes operate at times, especially in gouty and diabetic cases. An active internal medication directed toward the sublying systemic cause, must always be joined with the local treatment in all such cases. Rise in tension is due either to a change in the nature of the intraocular fluids or to obstruction of the angle of the anterior chamber by iris, lens capsule or other mechanical cause. Division of the obstructing band can often be accomplished by a sharp knife needle. The blood which may fill the anterior chamber consequent upon iridectomy is seldom of consequence, but the massive hæmorrhages which at times occur and are dependent upon ruptures and varicosities in the choroidal veins usually demand enucleation. With the first symptoms of that most dreaded of all complications, panophthalmitis, the lips of the wound should be cauterized and hot compresses applied. Mental disturbances arise on the 2nd and 3rd day after operation in nearly 10 per cent. of all cataract cases. The cause is largely psychic, dependent primarily upon impoverished brain cells in consequence of sclerotic vascular changes. Normal cerebration returns in a week or more, insanity arising only in cases who had manifested mental changes prior to operation.

Unusual Procedures in Cataract Operations.—Dr. William Zentmayer.

Preliminary iridectomy may be performed either as a preparatory operation for the extraction of a ripe senile cataract or an immature cataract either in a young individual or in the aged. In the first class of cases it is comparatively rarely done, in the second it is usually associated with some procedure calculated to induce maturation of the cataract, and in the last class it may be done to avoid the greater danger of dense secondary when the combined operation is done. In this class the preliminary operation is not frequently done as experience has shown that there is little cortical remaining at this time of life.

Ripening operations may be done with or without iridectomy. In the earliest, Foerster's, an iridectomy was combined with massage of the lens through the cornea; later Bettman, White and others did direct trituration by the introduction of a spatula into the anterior chamber with which the lens capsule was stroked.

About ten years ago, Tynen, of Texas, who was performing capsulotomy as the first step in cataract operations, stated that he thought that at the extraction of immature cataracts the lens escaped more readily. Some years later Homer Smith advocated preparatory capsulotomy for the purpose of ripening the cataract. His operation consists in making a crucial incision in the anterior capsule with a specially devised miniature scalpel and 24 hours later delivering the lens. Later Fridenberg modified the operation by two peripheral parallel incisions so that a capsulectomy could be done at the time of the extraction of the lens.

For the extraction of immature cataracts the Smith Indian operation is applicable. (Operation described.)

The use of corneal sutures to aid in early union of the lips of the wound was discussed. They were considered of value in cases where loss of vitreous was anticipated. The sutures should then be inserted before the section is made, the suture being of sufficient length that the loops may be drawn aside while the section is being made.

The advantages of having a complete conjunctival flap has led to the adoption of the usual procedure of injecting a few drops of some sterile solution in the conjunctiva in the position of the counterpuncture so that the point of the knife can be carried the required distance under that membrane after emerging from the corneal tissue. In making the puncture the point of the knife is entered under the conjunctiva before penetrating the corneal tissue. If the knife is brought out subconjunctivally on finishing the section, a complete conjunctival flap will have been secured. The recent Belgian method is ingenious and has but one objection, the danger of infection by the presence of two sutures. In operation the conjunctiva is freed from the upper limbus over the area included in the corneal incision and undermined for some distance. A suture is inserted at either end of the conjunctival flap and brought out on the bulbar conjunctiva at the limbus a short distance below the point where corneal incision starts; by tying the two ends of each suture the conjunctiva is drawn down over the cornea, completely covering the corneal incision. Couching of the lens might be necessary to give sight to an insane person with cataract or it might be called for in the presence of a virulent conjunctival secretion which had proved rebellious to treatment in the presence of a dacryocystitis if circumstances existed precluding extirpation of the sac.

Operations for After-Cataract.—Dr. Wendell Reber.

The conditions which "after-cataracts" present vary according as the healing of the eye has been complicated or uneventful. The simplest condition with which you will have to deal is an eye which has healed easily. Ophthalmoscopically with a plus 7 to plus 12 small opacities in the posterior capsule will be seen. For such condition a T or crucial incision is done.

Another cause of "after-cataract" is a proliferation from the remaining lenticular cells. It will give rise to a denser mass to deal with. If there is lenticular matter to deal with it may become massed on the anterior capsule. These three conditions, however, are reasonably easy to cope with. When iritis or cyclitis follows an operation, it is a different story; it almost surely compels some manner of secondary operation. About 40 per cent. of operated cataracts present some degree of post-operative iritis. I do not speak of transient conditions, I mean the condition that begins to develop about the 6th day after operation, this in spite of a very careful extraction and the most careful treatment of the case afterward.

When the eye has quieted down completely after an iridocyclitis and has so remained for two or three months, instead of a simple incision, it will be necessary to do an iridotomy. This may be done with De Wecker's scissors, or with Ziegler's iridotomy knife. With this instrument one can sometimes secure a very satisfactory pupil even though its edges be irregular. It is a difficult operation to do. If the knife is introduced too far back one doesn't get as good a fulcrum as if the entry point is 2 mm. in front of the limbus. The least traction exerted on the iris and ciliary body the better. No bandage should be applied but atropin and argyrol (20 per cent.) instilled at once, ice compresses applied to the eye and a course of calomel administered internally. This will usually prevent recurrence of the post-operative inflammation.

All iridotomies and capsulotomies or capsulectomies should be done under artificial light with strongly condensed illumination. Careful study of the field of operation (before operating) under condensed light is imperative if success is to follow.

The users of capsule forceps (capsulectomy) agree that they render unnecessary a secondary operation on the capsule. Recent reports would lend much probabability to this claim. This point is not yet absolutely proven, however.

DISCUSSION.

Dr. Zentmayer said that in cases of dense inflammatory membranes he would try the Ziegler operation and if this failed he would do the operation devised, he thought, by Kuhnt. A narrow Graefe knife is entered at the lower third of the cornea one mm. inside the limbus, the point is thrust through the iritic membrane at once, the blade is then carried parallel to and behind the iritic membrane until a point about one mm. from the opposite limbus is reached; it is there brought out through the cornea and a downward incision through membrane and cornea is completed. The iris incision usually springs open, giving a large opening; should it not have sufficient resiliency for this to result it may be grasped with forceps and brought out through the wound and there snipped off.

Dr. Reber: The suggestion encountered in many text-books that "prolapsed vitreous should be cut away with scissors and the toilet of the wound then completed" has always interested and amused me greatly. Most frequently the vitreous is semi-fluid and shows a disposition to flow all over the field of operation. To attempt to abscise such vitreous is to my mind a fearful waste of precious time. The average operator in the presence of vitreous loss is only too anxious to get the speculum out as quickly as possible and allow the eye to close. Usually the patient realizes that something has gone wrong and becomes unruly. After the eye has been held closed a few moments they may regain their composure. Then if the lids are very carefully opened and the corneal conformer I have described is introduced the situation is entirely under control. The iris may be returned and if so desired a corneal suture introduced. I have done this three times. There is nothing I know of that will afford the feeling of security thus gained. I am distinctly of the opinion that some day this will become an accepted procedure in ophthalmic surgery. Vitreous loss is admittedly the most formidable complication of the cataract operation and anything that promises prevention or control of this calamity demands our carefullest consideration.

D. Forest Harbridge, Secretary.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

A meeting of the Section was held on Wednesday, February 5th, under the presidency of Sir Anderson Critchett.

Mr. G. Coats showed a case of congenital mesoblastic strand adhering to and penetrating the cornea. He suggested that if, in early fœtal life, the amniotic fluid was not sufficiently developed, or was too scanty, the amnion might come into contact with the eyes which were prominent at the time, and might acquire adhesion to the developing eye. Mr. A. Rugg Gunn showed a case of persistent hyaloid artery with massive white formation obscuring the optic disc. Mr. A. S. Cobbledick showed a case of congenital deformity of the inner canthus. Mr. J. B. Lawford exhibited a case of disease in the region of the pituitary body. The bitemporal hemianopsia was indicative of pressure on the chiasma; the patient showed no definite evidence of acromegaly; he had loss of sexual power, and was very drowsy. Mr. R. W. Doyne alluded to the prognostic importance of ascertaining the color fields beforehand. Dr. Grainger Stewart pointed out that the patient had the two other features associated with the condition to which Cushing drew attention, namely, general pallor, and a long distance between the ear and the outer canthus of the eye. The President showed a patient on whom he had performed peritomy in a case of corneo-iritis, the whole of the vascular conjunctiva having been very much thickened. Mr. Bickerton (Liverpool), Mr. Cruise, and Mr. Rayner Batten referred to the good results sometimes yielded by the operation, as in this case.

The resumed discussion on the Physiology of Intra-ocular Pressure will be published in a later number.

ABSTRACTS FROM MEDICAL LITERATURE

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

VALUE AND MANNER OF EMPLOYMENT OF CYANIDE OF MERCURY IN PREVENTION OR CARE OF EXOGENOUS OR ENDOGENOUS INFECTIONS OF THE EYE.

E. Grand-Clément (*Lyon Médical,* July 21, 1912) states that frequently repeated irrigations of the eye with a one to 2,000 solution of mercury cyanide for the three days preceding cataract operations eliminates all possibility of suppuration in the organ, first, by killing all microorganisms on the conjunctiva, and, second, by causing the formation in the interior of the eye of antitoxic bodies, preventing the action of any germs which might have gained entrance. Sub-conjunctival injections of the same solution constitute the most effective measure available to arrest or cure cases of chronic iritis or iridochorioiditis and, in particular, cases of atrophic chorioretinitis, for which hitherto no good remedy has been at hand.—*N. Y. Med. Jour.*

TREATMENT OF INTERSTITIAL KERATITIS BY SALVARSAN.

George W. Vandergrift (*Med. Record,* October 26, 1912) believes that salvarsan is by far our most efficient remedy in the treatment of interstitial keratitis. while the disease may be cured with mercury, it requires a longer time, during which connective tissue is likely to be deposited in the cornea which affects the ultimate vision. The action of salvarsan is so prompt and efficient that connective tissue is not formed, thus preventing the impairment of vision after the inflammation has subsided. In his experience salvarsan causes the absorption of the corneal infiltrate to a much greater extent than mercury, even after the inflammatory symptoms have subsided. While it will not cause the disappearance of the scars of a past interstitial keratitis, it will, if used when acute symptoms are present, check the inflammation and prevent the further formation of connective tissue.

BOOK REVIEWS.

CANCER, THE PROBLEM OF ITS GENESIS AND TREATMENT. By F. W. Forbes Ross, M.D. 1912, Methuen & Co. 36 Essex St., W. C., London, England: 5 shillings.

After a lengthy discussion of the genesis of cancer, which must be studied by the reader, and which is full of original thought, frequently at variance with generally accepted ideas, the author strongly recommends the treatment with large and continued doses of potassium salts (not iodide of potassium), or other alkaline salts and radium. With such treatment the author has not only succeeded in curing inoperable cases of cancer, but also in preventing recurrence after operation. A number of case histories apparently prove his contentions. The book is well worth a careful study.

PRISMS: THEIR USE AND EQUIVALENTS. With 118 illustrations, of which 18 are colored. By James Thornton, A.M., M.D. 1913, Philadelphia: P. Blakiston's Son & Co.

Like the previously published books by the same author, this treatise on prisms excels by its simple and clear diction. Starting out with general remarks on the nature of prisms and the refraction of light through them, he then describes their combination with sphericals and cylinders, either for continuous use or for treatment of muscular defects. The absence of mathematical formulæ, and the many illustrations make this little treatise especially valuable to the student. ALT.

SPECIAL MEETING OF THE BELGIAN SOCIETY OF OPHTALMOLOGY—August 2, 3, 1913. On the occasion of the Universal Exhibition at Ghent (April to October, 1913), the Belgian Society of Ophthalmology invites the foreign ophthalmologists to be present on the 2nd and 3rd of August next, at the Scientific Conference which it is organizing at Ghent, "the City of Flowers and Old Monuments." The Board of the Belgian Society of Ophthalmology begs their colleagues from abroad who intend to make any communication at this reunion to forward its title and summary, type-written if possible, to professor Van Duyse, 65, Rue Basse-des-Champs, Ghent, Belgium, before June 15, 1913.

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ORIGINAL ARTICLES.

A MICROSCOPIC STUDY OF THE CONJUNCTIVAL VESSELS.*

By W. H. Luedde, M.D.,
ST. LOUIS, MO.

REPORT ON A SERIES OF SEVEN HUNDRED EXAMINATIONS.

The transparency of certain ocular tissues permits their direct examination with the aid of a microscope while still intact, without waiting for stained sections.

Such examinations require instruments especially constructed for the purpose to secure the best results. In the Zeiss Binocular Corneal Microscope we possess an instrument better adapted for these studies than any previously devised. For a detailed description of it we must refer to previous publications. It secures depth perception, in addition to any desirable magnification, provided the observer is capable of binocular vision. A substitute may be devised by using the tube of an ordinary microscope and illumination supplied by a pocket flashlight. The appearance of tissue is different when examined with the naked eye or with a microscope during life, or in a thin section after hardening, staining, and mounting. Each method has its particular advantage.

The location and extent of lesions and of foreign bodies, etc., in the anterior segment of the globe can usually be detected with ordinary visual acuity, aided sometimes by a simple loupe, as well as with any stronger microscope, for the reason that the increase in the size of the picture with the microscope does not make up for the decrease in the size of the field. However, there are small but very significant lesions due to injury or disease which can best be studied under the highest available magnifying power. To a novice the appearance of the tissue thus enlarged may be confusing, but after a little experience no other method of examination can be so perfectly satisfactory.

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*Read before the St. Louis Medical Society, April 19, 1913.

The tissues of the eye have long been used for the study of vascular conditions. In 1851 Helmholtz invented the ophthalmoscope, making possible the direct examination of the retinal vessels. The study of vascular phænomena in the retina has continued unabated ever since. Coccius, a year later (1852), demonstrated the conjunctival circulation microscopically. So little attention was given to further studies of the conjunctival vessels or their circulation that several later observers re-discovered this phænomenon independently.

After the demonstration of the conjunctival circulation was made here three years ago, before the Medical Society of the City Hospital Alumni, it was repeated on account of its novelty before several scientific societies in this city and at the physiological laboratory of Chicago University.

Microphotographs of the ocular tissues during life have been made with the binocular microscope by the aid of a strong arc lamp. My own attempts with illumination less trying to the patient have been rather unsuccessful. The length of exposures, even with the most rapid plates, is such that imperceptible movements of the eye are bound to blur details of the negative.

The fact that the movements of the blood corpuscles can be followed proves the possibility of studying minute tissue changes with the binocular microscope. The study of the circulatory movements in the conjunctival vessels is exceedingly fascinating. In the general character of the conjunctival vascular supply we have the greatest similarity to the general vascular supply of the body—skin, muscles, etc. We see here vessels which anastomose freely, which are stretched, shifted, or thrown into folds by the ocular movements, which are exposed to the extremes of outside temperature and are affected by local irritation or pressure. They are more nearly representative of the general circulatory system than the other ocular vessels. The retinal vessels do not anastomose, resembling rather those of the brain, while the chorioidal vessels are fixed in their position in the tissues and are but little disturbed by mechanical or other outside influences.

That treatises on diseases of the general vascular system have ignored the possibilities of studies on the conjunctival vessels is apparent in the following quotation concerning the flow of the blood from such a volume published only last year:

"The farther away from the heart the measurements are made the more even the flow. In the capillaries it is quite steady, as any one can prove by direct examination of the web of a frog's foot or the cat's mesentery. The rate in man is estimated to be btween 0.5 and 0.9 mm. per second."

Observations on the circulation in the "web of the frog's foot" or in the mesentery of the cat traumatically irritated, can hardly be as typical for the movements of the blood stream in human capillaries as are the observations made on the capillaries in the conjunctiva under normal conditions. As a matter of fact the findings on direct examination of the corpuscular movements in the human conjunctiva do not agree with the above statement.

For example, we find that the rate varies in the different arterioles, capillaries, and veins from a barely perceptible motion to a little more than 1 mm. per second. Local irritation engorges the vessels and changes the rate. Further, some parts of the capillary network are ordinarily supplied with blood elements *only* occasionally. This is shown by the passage of a column of corpuscles along a certain line, followed after an interval of several seconds during which no corpuscles pass, by another column in the same line as before. All of which proves that the flow in the human capillaries is less "steady" than was supposed by the author of that volume.

Even a regurgitation of blood in the capillaries and smaller vessels has been noted. The flow is sometimes almost equally divided between the two directions, raising the question if it has a fixed direction. In my previous publications attention has been called to this phænomenon of regurgitant capillary flow with the endeavor to explain its presence by low blood pressure, vasomotor disturbances, or general fatigue.

Capillary regurgitation is present where an aortic lesion is marked; however, the cases referred to above showed *no cardiac* lesions on special examination. Recently we found this capillary regurgitation in a man aged 25 years suffering from hyperthyroidism. His blood pressure was 160. He likewise showed early vascular changes producing obstruction in the capillaries, to which we shall refer later. As we have previously demonstrated capillary regurgitation after syncope, it may be that some connection exists between the regurgitation in the capillaries and the weakness and exhaustion of which this patient complained.

With the aid of the ocular micrometer and a stop watch, the rate of the capillary flow can be rather accurately measured. As a suggestion for further study in this line, consider the advantage of recording the exact effect of cardiac stimulants, etc., upon the capillary flow. For, to obtain a perfectly balanced circulation, cardiac compensation should go hand in hand with the freest possible capillary flow. A series of cases thus followed, selecting several conjunctival vessels, arterioles, capillaries and veins, and, after carefully noting the flow and the distention of the vessel, repeating these measurements after the administration of various circulatory stimulants, might add some facts worth knowing to our general fund of information concerning these drugs.

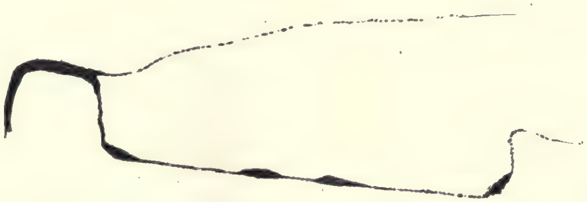


Fig. 1. Sketch showing Conjunctival Vein of man aged 30, suffering from Exopthalmic Goitre. Micro-photographs were not successful. (Drawn by Dr. F. O. Schwartz.)

But it is not the purpose of this paper to deal so much with the circulatory phænomena as with the manifestations of changes in the blood vessels themselves.

The first series of examinations to determine the presence of changes in the conjunctival vessels was made three years ago at the request of Dr. W. W. Graves in connection with his studies on the "Clinical Significance of the Scaphoid Scapula." No exact description of the changes to be expected in vascular disease in these vessels was at hand to guide us, but certain appearances showed clearly a departure from the normal.

Sacular or fusiform dilatations in the lumen of small arterioles, veins or capillaries are no more normal there than in the larger vessels where they are subject to macroscopic demonstration. The conjunctival vessels are normally tortuous to permit their adaptation to the extreme movements of the eyeball. But it is not normal to find sharp angles in the course of a vessel, instead of the usual undulating tortuosity. The lumen of normal healthy blood vessels shows no abrupt break in size and shape except as due to branches. When the lumen as outlined by the blood contents suggests a string of beads or becomes "crinkled" like a thin celloidin section, passed into oil without dehydration, we are as certain to find pathological processes in the vessel wall as if we had a hardened artery under our finger. It is not within the scope of this paper to discuss the various views of investigators concerning the exact beginning or the progress of arteriosclerosis (better angiosclerosis) from a histological standpoint. It seems to be accepted that no important changes occur in the wall of a blood vessel that do not show themselves earliest in their effect on its lumen as obstruction or dilatation or both. Experience has shown how difficult it is to recognize these early changes in the caliber of vessels from the examination of cross sections under the microscope. Unless each section is an exact cross-section at right angles to the axis of the vessel—a variation in caliber proves nothing. It may be a real narrowing or dilatation, or it may be a section cut slantingly which shows an apparently larger area.

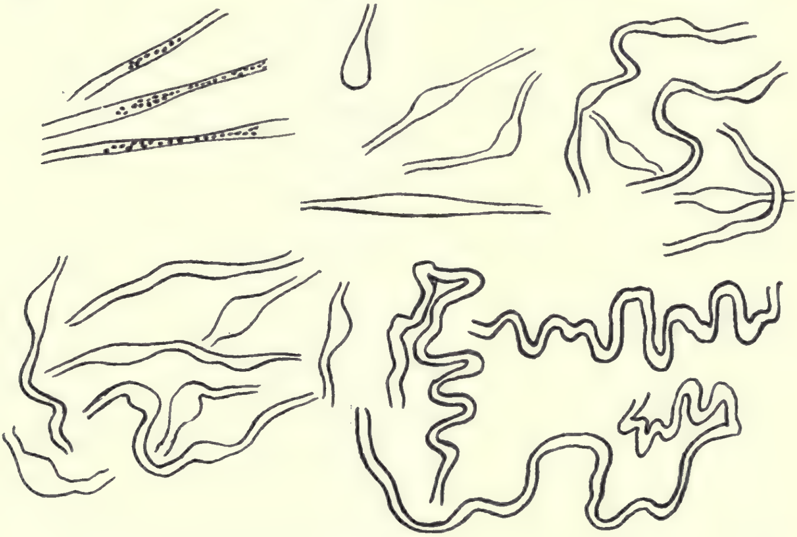


FIG. 2. Rough Diagrammatic Sketch showing the various Stages of Vascular Changes as observed in the Conjunctival Vessels. Encroachment on lumen of capillaries (upper left hand), then capillary aneurisms, finally marked varicosities and irregular tortuosity in larger vessels (lower right hand). Drawn by Dr. F. O. Schwartz.

This was easily tested by securing pieces of conjunctiva (for which I am indebted to Dr. D. L. Harris, city pathologist,) imbedding them in paraffin and then cutting them in a series. Following a small artery through twenty consecutive sections, averaging 7 micron each in thickness, its maximum diameter varied from 29 to 46 micron while its transverse diameter varied from 11 to 22 micron. In the same way the maximum diameter of a vein varied from 44 to 133 micron, while its transverse diameter varied from 9 to 37 micron. These variations occurred without the presence of any evidence of vascular disease.

It is obviously out of the question to get serial sections of these smaller branches in which the errors arising from change of this relation between the axis of the vessel and the plane of the section can be eliminated. Histological examinations are thus inadequate to study the earliest stage of angiosclerosis.

To learn more about the frequency and significance of the presence of the dilatations in the conjunctival vessels above noted a large number of individuals had to be examined.

Through the courtesy of Major D. C. Howard, U. S. Army, it was possible to make these examinations at Jefferson Barracks. The men examined were with few exceptions those who had passed the rigorous physical examination which precedes actual enlistment and were found free from physical defects or the active manifestations of any disease. The examination was not extended beyond a search for the presence of aneurysmal dilatations in the conjunctival or episcleral vessels. Both eyes were examined. Only the cases which clearly showed these irregularities were designated "positive".

Colored men among the troops proved quite unsatisfactory for these studies. The amount of pigment they have in the conjunctival and subconjunctival tissues usually hides the finer divisions of the vascular system from inspection. As is readily noticed on close inspection, the "whites" of negroes' eyes look so strikingly white only from contrast with the dark iris and skin. As a matter of fact there is considerable pigment in the scleral conjunctiva of colored people.

The absence of dilatations does not exclude all varieties of vascular disease as we shall find later, but their presence was the basis for classification in the first and larger series. Of the 625 men whose examinations were recorded, 139 or 22.2 per cent. showed "positive" findings.

The average age of the "positive" cases was 23.82 years, while that of the "negative" ones was 21.73. This finding is in accord with what might be expected. The older the men the greater is the likelihood of vascular changes. As the men examined were so nearly of the same age, we could not expect a very great difference in the ages of the two classes.

In a group of men all of whom had been selected for the army on account of good physique and robust health it is difficult to select certain physical signs as significant of the advantage of the one class over the other. Jefferson Barracks receives recruits, keeps them a short period for preliminary training, and then sends them to all parts of the globe, wherever the U. S. Army has need for them. Therefore it was not possible to make extensive records of the health or sickness of the members of these groups for comparison. Even had it been possible, the short period of a three year enlistment could hardly reveal conclusively the physical superiority of one over the other at their age.

For further data we then turned to the measurements made of the height, weight, and chest expansion at enlistment. As might be expected the group that averaged more than two years older, that is the one with positive findings, also showed greater weight. The average weight was 146.25 pounds for the "positive" and 140.90 pounds for the "negative".

The average height was 68.21 inches for the "positive" group and 67.03 for the "negative" group. We must remember that a majority of these men were 18 to 22 years of age. An increase of 1¼ inches in height; and of 5⅓ pounds in weight is a natural phænomenon in the 2.1 years which separated the average man in the two classes.

Therefore, the apparent better showing of the men with positive finding comes to naught. But there is another factor which, in my opinion, tends to show that the group of "negatives" really embraces the better men physically.

The chest expansion in the "negatives" was one point better than that of the "positives", in spite of the fact that the latter had greater height and weight.

There was available also a hospital record, during their stay at Jefferson Barracks, for 22 men in the "positive" group. Of these all but three left the post in the course of three or four months so that this record is of little value as proof, but it is rather suggestive. Nine of the twenty-two suffered venereal diseases in some form as follows:

Gonorrhœa	4
Gonorrhœal Arthritis	2
Syphilis (tertiary)	1
Chancroids and Bubo	1
Prostatic Abscess	1

One case had enterocolitis, marked arterio-sclerosis, and premature senility (aged 53), and was discharged for disability. One case of acute rheumatism and two cases of tonsillitis, make a total of 13 cases out of the 22 in which we might expect to find such evidences of vascular disease as were present in the positive group.

Considering the entire series, it seems that these changes in the conjunctival vessels are no more abundant (22%) than might easily be accounted for by vascular diseases through inherited or acquired syphilis, rheumatism, autointoxication, etc.

The next step was to examine the victims of a disease known to produce vascular changes. For that purpose cases were selected in whom the diagnosis of syphilis was positive clinically and usually by Wassermann tests as well. It was proposed to study the extent of these changes in the conjunctival vessels in the different stages of the disease to discover, if possible, a relation between them. The classification of the findings had to be made without precedent. No previous system was available for comparison.

The last series of cases was begun after the first examinations at Jefferson Barracks had been concluded. It is also entirely independent of the series examined with Dr. Graves three years ago in which were many syphilitics and heredo-syphilitics. Nor does it include numerous examinations made in private practice during the last three years in which the constancy of lesions in the conjunctival vessels in syphilitic cases had attracted attention.

Again I am indebted to Major Howard and Capt. Pillsbury for the privilege of examining the cases in their special syphilitic clinic. Also I am obliged to members of the visiting and resident staff of the City Hospital for similar opportunities, and to Dr. Engman for the cases examined at the Barnard Skin and Cancer Hospital.

The first and most striking observation was that more or less pronounced changes of the types above described as pathological were demonstrable in each case except two, to which I shall refer later. In fact most of them were demonstrated to physicians present when these tests were made at the various hospitals. The appearances were noted in each case according to the abundance of aneurysmal dilatations and their type, also of the size of blood-vessels involved. The findings were then charted, recording age, duration of disease, etc.

If a clear history of the several stages of lues could be obtained it was noted in the respective column. The last three columns contain the results of Wassermann tests in cases where it had been made, notation of the presence of aneurysmal dilatations in the conjunctival vessels, and special items. The simple presence of dilated capillaries in the ocular conjunctiva was indicated by a plus sign. Their abundance was indicated by a double plus sign and their rarity by a plus sign followed by a minus sign.

This table furnished the first revelation that these are not haphazard appearances, but that they have rather definite relations to the severity and duration of the diseases. So definite, in fact, that at the City Hospital we began at last to estimate the duration of the disease from the conjunctival picture with surprising accuracy. However, it is not a method so definite that sole reliance could be placed on it for that purpose. We succeeded by charting these findings in bringing some order out of the chaos of nearly a thousand previous observations.

Neglecting the factor of age and other diseases we made comparisons, and found the average duration of the disease in groups classified according to the abundance and kind of vascular change noted.

We excluded hereditary cases because "duration" in these cases is not comparable with "duration" in acquired lues. Another case was omitted from the calculations because trachoma existing for many years had so altered the conjunctival tissues that it seemed improper to consider it with the rest.

In the first group were two young men (cases No. 26 and No. 40), with unmistakable chancre, who had come into the hospital at once. Their conjunctival vessels examined at the end of three weeks in the one and one month in the other showed nothing pathological. These are the only cases in the entire series in which the conjunctiva showed no vascular change. No small significance attaches to the fact, that these were *young* men and that the infection was *very recent.*

The second group contains the cases which showed few capillary dilatations and almost no other evidence of vascular disease. The average duration of the disease was found to be 3¾ months for this group, with a maximum of 8 months and a minimum of 1 month.

A case in the second group deserves our special attention. A recruit, aged 22, who had deserted, when caught and returned to the Barracks, was found to have a fresh chancre. The Wassermann test was negative, but the spirochete pallida was demonstrated in the lesion. Beginning obstruction in some of the finer capillaries was here demonstrated, of such a nature that it may readily explain the early capillary aneurysms.

The obstruction in these capillaries may be a slight swelling of the retina or may be due to the actual presence of spirochetæ. The effect of such an obstruction is the bulging of the healthy capillary wall on the proximal side of the lesion. In capillaries such a change can occur quickly. If, due to thickening of the intima, the obstruction gradually becomes complete we may expect the formation of a sacular aneurysm.

Under other conditions, various types may develop. Sometimes the flow of blood is not entirely stopped and a fusiform aneurysm results. Often we were able to trace the flow of corpuscles through the dilatation, proving conclusively that they are integral parts of the blood supply of the conjunctiva.

This explanation of the formation of the dilatations was advanced first at our demonstration of the conjunctival circulation, in 1910. Similar observations have been made upon the retina and are recorded by the late Dr. Edw. L. Oatman, of New York, in a most excellent article on "Arteriosclerosis of the Retinal Vessels", in *Ophthalmology,* July, 1912, as follows:

"Miliary aneurysms form on the small arterioles and capillaries. In the larger vessels, aneurysms and varicosities occur where the walls are least affected. Frequently, they form immediately behind a rigid constriction which acts as a dam to the blood current. Retinal aneurysms seldom attain a large size owing to the compression exerted upon the vessels by intraocular pressure."

The perivascular tissue offers some restraint to the growth of miliary aneurysms. Their thin cellular wall is probably ruptured before they get to be more than eight or ten times the diameter of the vessels from which they originate. Even then, if springing from capillaries, they are too small for recognition with the naked eye.

In one case among the soldiers in the first series examined at Jefferson Barracks, the recent rupture was easily demonstrated to the medical officers present. Other unruptured aneurysms were also present in the same individual.

A change of position of the eye, through torsion of the vessels, rubbing the eye, or even the pressure of the eyelid in closing may be sufficient to rupture one of these aneurysms. Thus, we can account for the not infrequent occurrence of spontaneous subconjunctival hæmorrhage.

That this destruction of these miliary aneurysms does take place is further apparent from a consideration of the remaining groups. There were two groups of cases showing but few aneurysms in the conjunctiva. One was the group we have just considered, in which the luetic infection was quite recent, the other was made up of cases of long standing lues.

The difference between the two classes was that in the first we had few capillary aneurysms *without* changes in the larger vessels, while in the latter we had a few capillary aneurysms with *marked* changes in the larger vessels such as "beading"—"crinkling" thickened walls, shown by dense white streaks accompanying the blood column, sharp angles instead of the usual tortuosity, etc.

In cases of the latter class, we found capillaries, shut off at both ends, with an immobile column of corpuscles distinctly in single file, but no longer of normal color. Their brownish tint showed that after being trapped in the capillary as its lumen closed their hæmoglobin had been reduced. Their position remained unchanged for the period during which these cases could be watched. The average duration of syphilis in the cases which manifested these later stages of vascular disease in the conjunctival vessels was 13.5 years.

In a case of long standing lues examined at the City Hospital, showing the destructive lesions of the tertiary stage, we were much impressed by the *whiteness* of the inter-vascular spaces. It was explained by the partial absence of capillaries and consequent lessening of capillary circulation. What we saw was white bloodless sclera. Scarcely any miliary aneurysms could be demonstrated, but the lumen of all vessels was irregular as in the later stages of vascular deterioration.

Secondary changes, which destroy these aneurysms, reduce the capillary circulation, thus lessening the nutrition and vitality of the tissue involved. Thus we can account for the "pallor" in old syphilitics where the hæmoglobin index remains normal, on which Graves lays special stress in his recent article on the "Clinical Recognition of Syphilitcs".

The rupture of capillary aneurysms and the deposit of blood pigment in the inter-vascular spaces, which we may assume occurs unnoticed in the skin as well as in the conjunctiva where we could see it, accounts in part for the pigmentation of the skin in syphilitics, referred to by the same author.

If we consider these processes, observed in the conjunctiva, as happening in other organs of the body, and in the brain and spinal cord, we are enabled to account for many degenerative changes noted in the later stages of syphilis and in old persons suffering from angiosclerosis.

That section of our series of syphilitic cases in which aneurysmal dilatations were marked, was divided into two groups. The first group with a moderate number showed an average duration of syphilitic disease of 6.4 years, while the second group in which these dilatations were abundant showed an average duration of 4 years. All pointing to the presence of capillary aneurysms at rather an early stage of the vascular disease which follows syphilitic infection.

Whether this is true of all infectious diseases affecting the vascular system cannot be determined from the evidence at hand. But there seems to be no valid reason why other infections, measles, scarlet fever, etc., even malaria and grippe should not produce similar changes.

The classification of the findings in hereditary lues is more difficult than in acquired lues. That vascular changes are apparent at an early age was shown in the series examined with Dr. W. W. Graves, to which he refers in his first article on "The Scaphoid Scapula". While there was frequently marked "crinkling" or "beading" of some of the vessels, we did not as a rule find the capillary dilatations (miliary aneurysms) so characteristic of the earlier stages of acquired lues. Until the examination of a larger series of young children has been completed we can only speculate on the reasons for their absence. It may be that the capillary circulation is involved very early, even during intrauterine life.

Though we have succeeded in classifying our cases in this manner, we must remember that what we see in this series is the result of syphilis, plus heredity, plus age, plus all other fevers, infectious diseases, intoxications, organic and inorganic poisons, plus exposure, plus worry, plus work, etc., including the whole category of harmful influences as well as the regular wear and tear in the process of living.

The figures in another series would probably show wide variations from our present table, but the general findings should be similar. On account of the universal prevalence of these diseases, the labor of measuring the effect of any one on the vascular system is despairingly difficult.

Study of the retinal and conjunctival vessels in health and disease has furnished a large share of the information we possess. The comparative value of the two methods in the early discovery of vascular changes will be clearer after referring to this report of a "classical case" in Oatman's article which, he says, "exhibited all the fundus changes that belong to the early stages of diffuse arteriosclerosis."

"Boy, 15 years of age, sought medical advice because of recurring epistaxis. Incidental examination of the fundus oculi at once revealed the probable cause of hæmorrhage. The arteries were moderately dilated and more tortuous than the veins. Small vascular twigs were unusually numerous and distinct. With a weak illumination the walls of the arteries were seen as faint lines bordering the blood columns. The central light streak on the arteries was unusually bright and sharply defined. There was a strong locomotion pulse, especially marked wherever an artery made a sharp bend. The veins appeared of normal size and not unduly tortuous. There was a strong, negative venous pulse confined to the disc. The disc itself was uniformly reddened. Urine contained albumin and hyaline casts. Heart moderately dilated. Surface blood pressure was 120 mm. Hg."

Notice that the description of the retinal appearance is made up largely of relative terms, such as "small"—"more"—"moderately"—"unusually bright" and others. The value of such a description depends entirely on the interpretation and the mental attitude and experience of the observer.

The direct unequivocal statements aside from the urinalysis and blood pressure pertain to arterial and venous pulsation. Pulsation is or is not present, but in another part of the article Oatman states that Raehlmann's opinion that venous pulsation is a "nearly constant symptom of arteriosclerosis" in the retinal vessels may be questioned.

In the later stages of arteriosclerosis the retinal appearances are quite positive, but even then do not permit an independent and conclusive prognosis concerning the general health of the individual.

On the other hand, the changes in the conjunctival vessels are demonstrable as soon as their lumen is encroached upon, making it possible to discover the first symptoms of vascular disease. Furthermore these signs are so clear and definite that they can be recognized unhesitatingly by any careful observer.

Evidence obtained from any ocular symptom of arteriosclerosis is only of relative and corroborative importance. Nevertheless, no clinician can afford to overlook what might be learned by a careful study of ocular conditions including microscopic investigation of the conjunctival vessels in any case of vascular disease.

Especially is this true in those cases where the onset is stealthy and obscure and where an analysis of the general findings and symptoms seems to lead to nowhere. Not infrequently such cases will be found to be the victims of early angiosclerosis and will clear up after treatment of this condition and its underlying causes.

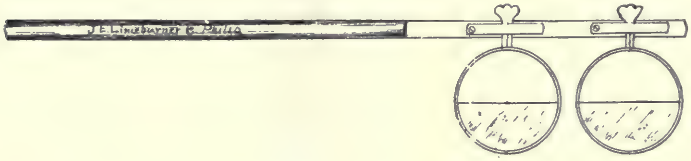
AN INSTRUMENT FOR HOLDING A PAIR OF LENSES IN FRONT OF A PATIENT.

By John Neely Rhoads, M.D.,
PHILADELPHIA, PA.

I presume it falls to the lot of all oculists to have early presbyopes return after correction and say that they cannot read with their glasses, but at the same time acknowledge that they can see clearly at a distance. I, myself, am doubtful whether presbyopia comes on much before forty-five. To be sure, I occasionally have it proven to me that it does; still, it is always open to a couple of doubts; one, as to whether I have absolutely corrected all errors; and the other, has there been some mistake—however remote and unlikely—in the birth record? Be that as it may, they do come with the complaint that they cannot see to read with their glasses while being able to see distinctly with them at a distance. For such cases I seize the instrument as seen in the cut, which has been reduced one-fourth, and place a pair of plus lenses in it of any desired strength, and after giving the patient a reading card hold the lenses in front of their prescribed glasses. Now, if they say I can read nicely with that, and I have inserted the full sized lenses, I ask them to look at the card twenty feet away, when to their amazement, of course, they cannot see plainly. It is then that I use the half lenses, as the illustration shows, which, to be sure, will enable them to read at fourteen inches or at twenty feet.

Then, too, a patient may come back after a year a two and say that she can see as well as ever at a distance, but that something has gotten wrong with her glasses so that she cannot thread a needle. This instrument makes it very easy to show the want of new glasses in these cases.

It sometimes happens to operators who have not yet installed the sphero-cylinder trial lenses, that they need to add a fourth lense in front of their already filled trial frame. With this instrument an extra lens can be temporarily held in front of a filled trial frame with one hand, and with the other a cross-cylinder or other auxiliary instrument can be manipulated in front of it.



In the treatment of myopes, also, this instrument will be appreciated, as it is very convenient to show them that they should use two pair of glasses.

For those operators who still make their examinations without cycloplegia, this instrument will be exceedingly handy, because it will accurately hold a pair of minus or plus lenses so that they can be deftly moved in front of the correction. In fact, for work without cycloplegia I would suggest the use of two of these instruments, one holding a pair of minus and the other holding a paid of plus lenses.

MANDIBLE CAPSULE FORCEPS.*

By A. E. Ewing, M.D.,
ST. LOUIS, MO.

In a recent rectangular keratome extraction of the lens, in which the bread-knife capsule forceps, described in this Journal in the December number, 1912, were employed for the removal of the capsule, it happened that the blades of the forceps were opened somewhat wider than usual and the temporal edge of the lens slipped into the grasp of the right blade. Instead of the blades being closed so as to cut the capsule, they were closed only sufficiently to firmly grasp the lens, and by a little gentle manipulation the lens in its capsule was readily withdrawn. This was followed by a slight presentation of vitreous in the wound without an actual loss. However, as the wound refused to close by about two millimeters, the presenting portion was purposely ruptured and the excess removed by means of a Theobald scissors, which permitted the lips of the wound to become properly approximated. Healing was prompt and the final result was a perfectly clear pupil and normal vision.

This accident has led to the construction of another form of this knife forceps, the blades having somewhat the shape of the mandibles of certain beetles, being curved to one another on the flat in such a way as to leave an open space in the center of the cutting portion, as is shown in Figure 1 A. With this arrangement there is a gain of 1.5 mm. in the width of capsule that will come into the grasp of the forceps. Experience with the instrument is too limited to have fully determined its value, but in the single instance in which it has been used the result has been ideal. With this wider grasp it may often be the means of removing the lens together with its capsule in cases where the zonule is tender and friable and the lens substance in this undivided central space offers sufficient resistance. This would be accomplished without pressure and excessive traction on the globe and without injury to the vitreous. Judging from previous results with this form of forceps, the capsule will assuredly be abscised and withdrawn. However, in about fifty per cent. of these cases, there has been a slight loss of vitreous, possibly due to a division of the capsule too near the margin, or to lack of skill in handling a new instrument. Aside from this, the results indicate that the instrument accomplishes its object very satisfactorily.

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*Read before the St. Louis Ophthalmological Society, May 26, 1913.

In the accompanying diagram, Fig. 1, the cutting edges of the blades and the mode of their approximation is represented at

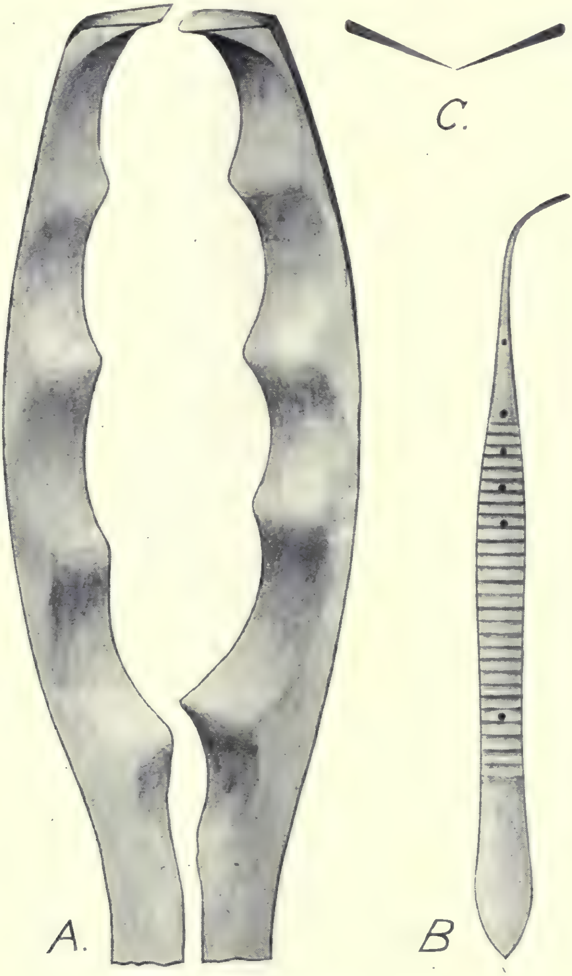

Fig. 1. Mandible Capsule Forceps.

A, greatly enlarged, while the actual size of the instrument is shown at B, and at C is given the angle of the cutting edges of the blades one to the other, or the manner in which the edges of the knives set backward. The edges of the blades may be regular, or they may have an undulating bread-knife, or mowing blade serrated form. In the handle there should be guides and stops so arranged that the blades will approximate accurately in order that the small end knives, or teeth, may hang and hold the abscised portion of the capsule. To avoid engaging the posterior surface of the iris, these teeth should be slightly rounded on their anterior corners. Also at the heel the blades should lock without injury to the knives in such a way as to cut the capsule clean; otherwise they will hang the capsule and rupture the vitreous by dragging at the lens margin.

The manipulation of the forceps is the same as with other forms of capsule forceps, the difference in its action being that the sharp blades cut the capsule and effect its removal without injury to its ciliary attachment.

ÆTIOLOGY OF PHYCTAENULAR CONJUCTIVITIS AND SUGGESTED TREATMENTS.

Howard F. Pyfer (*Penn. Med. Jour.*, December, 1912) believes that phlyctaenulosis is a manifestation of a general tubercular infection, if not a true tubercular lesion. While this theory is not accepted in any of the modern text-books he has reviewed, yet numerous writers, mostly European, have adopted it and he gives the views of quite a number, and summarizes briefly the results of tests made by many of them which tend to substantiate this theory. The results of his own investigations by the use of the tuberculin test are as follows: "In twenty-two patients, positive; sixteen, seventy-three per cent.; five had some other eye lesion, and one had only a slight reddening that I ruled out as not positive." These were private patients. Of the hospital patients tested, the results were: "In twenty-seven cases, positive in all, 100 per cent.; many of these patients had all the stigmata of tuberculosis." He says in conclusion:

The evidences, the clinical findings, the treatments all show that phlyctaenulosis is a tubercular manifestation of a general tubercular infection. Therefore let us treat the eyes of these little sufferers judiciously, bearing constantly in mind the importance of constitutional measures, emphasizing the use of tuberculin, the necessity of good diet, fresh air, sunshine and ocean breezes.

MEDICAL SOCIETIES

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

March 13, 1913.
Dr. Wendell Reber in the Chair.

Retrobulbar Neuritis of Nasal Origin.—Dr. H. Winfield Boehringer.

Dr. Boehringer reported the case of a woman 45 years of age with a family history studded with tuberculosis. Eight years ago in bed 7 weeks with neurasthenia. Two years ago had two post-eclamptic convulsions and for several days vision was misty in both eyes. She was up the 6th day. Four weeks ago patient had mild attack of grippe and was in bed for two days. This was followed in about a week by a bad coryza. A few days later she reported with sudden blindness in her right eye. Vision equalled 20/20 in the left eye and 20/200 in the right. Peripheral vision was better than central. Complained of pain over the right side of her head, especially marked in the right eyeball. Pain in the eye was sharp and severe when percussing over the frontal sinus and more so when the eye was palpated at the outer sclero-corneal junction; but palpation of the eye at any other point elicited no pain. Sudden movement of the eye, especially upward, caused great pain. Pupils were small and reacted to light, and accommodation. The media were clear, fundus details were negative except as to slight tortuosity of the vessels, the veins somewhat dark and full and a slight paleness of the temporal side of both discs. On taking the fields a large central scotoma was found but no concentric contraction of the form or color field.

The nasal mucosa was found engorged with no hypertrophy of the turbinates. Posterior examination and transillumination were negative as to the sinuses. Patient refused an x-ray. Vision varied as follows: First day 20/200, second day 10/200, third day fingers at 1 foot; fourth day fingers at 4 feet; fifth day fingers at 6 feet; sixth day fingers at 12 feet, which I found equalled 20/200. Next day after working hard, vision dropped to fingers at 6 feet. Did not see patient for 3 days and then vision was found to be 20/75. Vision is still intermittent and foggy and she describes letters as being flashed on and off as by electricity and somewhat luminous. Vision was found to be better on black card than on white one.

The diagnosis of retrobulbar neuritis was made from her sudden blindness following a history of grippe, which in turn was followed by a severe coryza and later œdema of the upper lid, pain in the right side of the head and on percussion over the frontal sinus and on the eye, and severe pain on movement of the eye together with a central scotoma. Hysteria and angioneuritic œdema were excluded. The treatment consisted of spraying the nose with 4 per cent. solution of cocaine and 1/5000 solution of adrenalin four times a day. 10 grains of sodium salicylate were given every 3 hours. Atropine until dryness in the throat and mouth occurred, which in this case was 1/200 grain every hour for 2 days.

Report of a Case of Papillitis of Doubtful Origin.—Dr. Luther C. Peter.

Mr. T., an Italian, age 45, always enjoyed good health until January last, when he suddenly developed severe pain in the right eye in three days. Pain disappeared and patient experienced no other symptoms until middle of February, when pain developed in the left eye. There were no other symptoms, pain having disappeared at time of consultation. Vision in right eye, at this time is limited to faint light perception, and in left eye, 20/30 partly. Pupil of O.D. is moderately dilated, does not respond but feebly to light and accommodation. Consensual contraction is present in the right eye when the left eye is exposed, but not vice versa. Some slight proptosis of O.D., about 2 mm.

Ophthalmic examination at this time, showed in the right eye a round pupil, clear media, disc very hazy in outline, grayish white in color, the cribriform membrane is obscured by exudate, veins are overfilled and tortuous and are lost here and there in retinal haze and œdema. Arteries are much contracted and show considerable perivasculitis, especially on the disc. Marked retinal striation and œdema, which extends some distance beyond the disc edge, but no hæmorrhages are visible and above the disc are several small white areas, which probably are the remains of old hæmorrhages, there is at this time not much elevation of the disc.

In the left eye the appearance is somewhat in contrast, although similar in some respects. There is more œdema, the veins are more engorged, arteries have not changed so much in calibre though somewhat narrow in size, the disc is not so pale, —evidently earlier stage of the same process described in the right eye.

Ophthalmic diagnosis: papillitis in receding or atrophic stage, in the right eye,—and an earlier, more active stage, in the left. Neurologic examination negative. Nasal examination negative. There is, however, an enlargement of the sella turcica. Wassermann test of the blood was also negative, but no test made from the cerebrospinal fluid.

Treatment consisted of daily hot packs, preceded by pylocarpin hypodermatically, ung. hydrarg. 1 dr. bd., by skin, and on Dr. Reber's suggestion the nasal passages were packed daily with 25 per cent. argyrol solution for 20 minutes. Since the institution of active treatment, vision has improved from 20/70 to 20/20 partly. Improvement may be due, however, to a recession of the œdema in the left eye, which may or may not have been influenced by the treatment.

Diagnosis in this case is difficult, as the report of both the rhinologist and roentgenologist in this case are negative so far as sinuses are concerned. Systemic disease of the central nervous system can be ruled out because of total absence of corroborative symptoms. Tobacco, alcohol and lead can also be eliminated as ætiologic factors. Tumor of the brain, other than syphilitic, has little corroborative evidence.

By exclusion, disease of the pituitary body and syphilis remains to be considered. Against syphilis is the negative Wassermann from the blood test of this patient. However, it is not unusual to find the blood test negative and the cerebro-spinal test positive in late nervous syphilis. In favor of the diagnosis is, first, the initial lesion; second, the tolerance of mercury; third, the improvement under the use of mercury; fourth, the perivasculitis noticeable in the œdema; fifth, the sudden development of the papillitis.

The question of a decompression operation was discussed and Dr. Peter felt that there could not much good come of such an operation at this time.

The Muscular Anomalies of the Eye Due to Sinus Disease.— Dr. William Campbell Posey.

By reason of the juxtaposition of some of the eye muscles with the walls of the orbit, and the very close association of the nerves which supply them with the sphenoid cavity, as they pass along the outer wall of this sinus, paresis, and even paralysis of one or more of the eye muscles, may occur as a consequence of sinusitis. While complete paralysis demands an inflammatory process of considerable intensity, and is usually occasioned by a cellulitis of the apex of the orbit secondary to either an active sphenoiditis or ethmoiditis, or more rarely to antral disease, paretic conditions of the muscles may complicate comparatively mild cases of sinusitis, and may occur when the rhinological examination reveals only a congestion of the mucous membrane lining the cavity.

Chronic empyematous conditions of the sinuses rarely occasion marked muscular insufficiencies unless signs of active inflammation arise, for the distention of the walls of the sinus under such conditions is gradual and the displacement of the globe which follows is so slow that the muscles have an opportunity to adjust themselves to the changed conditions of the visual axes under which they are forced to operate. In acute cases, the paresis is occasioned either by direct inflammatory infiltration of the long, broad, flat belly of the muscles themselves, as they lie in association with the walls of the sinus, or by an involvement of the nerves supplying them as they enter the orbit. As in many of these cases the function of the muscle is but slightly interfered with, diplopia is but rarely complained of, and can be detected only by careful search in the periphery field by the aid of a colored glass. Under such circumstances, the diagnosis may often be facilitated by requesting the patient to indicate in which direction movement of the eyes is especially painful, as considerable distress is often excited when the eyes are rotated into the position in which fullest demand is made on the affected muscle.

As a consequence of this paretic condition of the muscles, vision is often blurred, and while, as just stated, many of the palsies are not sufficiently marked to induce diplopia, when the eyes make their ordinary excursions, the imbalance created is sufficient to confuse vision, to cause vertigo, to excite reflex gastric symptoms and to render the near use of the eyes difficult. By reason of their anatomic relationships, paralysis of the levator, of the superior rectus and the superior oblique muscles, serves to indicate a probable involvement of the frontal cells; paralysis of the internal rectus, an involvement of the ethmoidal; and paralysis of the inferior rectus or inferior oblique muscles, an inflammation of the antral cells. As sphenoiditis may, however, implicate any or all of the nerves supplying these muscles, the value of differentiating the precise muscle affected, as a localizing symptom indicating the involvement of any particular sinus, is not great. Diplopia in the periphery of the field does not always indicate that a muscle has been paralyzed, for it may be induced by a slight displacement of the globe, either by exudation or by the distended wall of a sinus.

Ptosis from paralysis must not be mistaken for drooping of the lid from œdema. This differentiation is not always easy, for, as in all other signs and symptoms of sinusitis, both the œdema and the palsy may be transient and may disappear, only to reappear after several hours of days, or even longer intervals.

I am of the opinion that if many of the cases of palsy of extraocular muscles, attributed to rheumatism were analyzed that an affection of a sinus would be found to be the underlying cause in many instances. Such palsies may appear after "catching cold", and are associated with more or less pain on moving the eye, and possess other characteristics which suggest the presence of an acute sinusitis.

Thrombosis of the Central Retinal Vein Secondary to Nasal Disturbance.—Dr. Wendell Reber.

Dr. Reber reported the case of a colored man who came into the service at the Samaritan Hospital about 4 years ago. Man was about 45 years of age. Had been in perfect health for 25 to 30 years at least. Within two or three days he developed blindness in the right eye, vision being only 20/200. Had been examined by his medical man (who was a relative of his employer) but he could find nothing wrong.

In going over him we found a typical picture of obstructive disease of the central vein; the condition corresponding to that which used to be called apoplexy of the retina. He had some pain in moving the eye but no pain on pressure and no ciliary tenderness and no inhibition of the eye in any of the meridians. Had x-ray made and very careful rhinologic examination. Both negative. The general medical man reported his blood pressure to be 150 systolic and 10 or 15 degrees less diastolic. Practically normal pressure for his time of life. The urinalysis normal and the blood normal, in fact the man was in very good condition. The rhinologic report was doubtful, but I am no longer disturbed by a negative rhinologic report in the diagnosis of nasal disease.

Nasal disease will sweep in and do its damage and disappear by the time the ocular damage becomes apparent. In this man there was a negative Wassermann and von Pirquet. Insisted, however, that the rhinologist follow up the case, and after long rhinologic treatment of 19 to 20 days he regained vision of almost complete retinal picture. There is a slight change in his right optic nerve head, but he still holds on to his 20/30 vision. This was accomplished inside of four weeks without any other treatment whatsoever. I feel that here is a case in which we have shown that the trouble was due to latent sinus disease.

I am perfectly willing to put myself on record as believing that a goodly number of cases of thrombosis of the central veins have in fact been due to latent obscure *un-diagnosed* sinus disease. If there is one thing that to my mind is more important than anything else in the present day study of obstructive disease in the retinal vessels, it is latent obscure nasal disease; but this latent condition need not be purulent. From this fetish we hope the medical world will soon be delivered. It is apt to occur in the eye on the same side as the sinus disease.

Within 8 weeks of the time the above case was seen another colored man presented himself in our same service with thrombosis of the right central vein. The coagulation time of his blood was abnormally short. He ultimately regained vision of 5/9 under long continued small doses of sodium iodid (3 to 5 grs. tid.).

DISCUSSION.

Dr. Posey:—By reason of the intimate association of the optic nerve with the sphenoid bone, and as Onodi has shown, in many cases with the posterior cells of the ethmoid, this nerve is more or less implicated in the majority of active inflammatory conditions of these cavities. Indeed, were it not for the double layer of periosteum which covers the bone forming the barrier between the nerve and the sinus, and for the protection afforded by its sheath, it would be difficult to comprehend how this nerve could escape implication in any affection of the sinus, or the separating layer of bone is frequently as thin as paper and contains many deficiencies.

The involvement of the optic nerve, as a consequence of ethmoidal or sphenoidal sinusitis, may vary in degree from a simple œdema to an active retrobulbar inflammation. While this latter inflammation is rare, even in cases of marked sinusitis, œdematous infiltration is common, although as the change wrought in the nerve is but slight, the symptoms which it excites are not striking, they must be searched for with some care. As a rule, the patient complains of some dimness of vision in one eye, at times of vertigo, headache and other head symptoms. When the ophthalmoscope is employed, the unaffected eye is usually found to be normal, while in the fellow eye a slight veiling of the edges of the nerve is seen, with a dilatation of the retinal veins and a choking of the lymphatics around the central vessels. If the sinusitis is unchecked and retention of the contents of the cavity occurs, the nerve becomes more involved and the familiar signs of a retro-bulbar inflammation of the nerve appear.

In cases of even slight involvement of the optic nerve, the patient is usually conscious of a dimness in the affected eye, although if the vision be tested in the ordinary manner it will be found to be equally good in each eye; in other words, that the vision for form is normal. If the light on the chart be reduced, however, or if Bjerrum's test card is employed, the difference in vision between the two eyes will be at once manifest, and it will be ascertained that the dimness in the affected eye was occasioned by a diminution in the light sense, as a consequence of the œdematous infiltration of the highly organized bundle of fibres which supply the macular region.

The extent of the involvement of the nerve may be further studied by the perimeter, by means of which it will often be possible to differentiate relative central and paracentral scotoma, and at times a concentric contraction of the field. If the congestion of the nerve progresses to inflammation and the conducting power of its fibres is further interfered with, then more positive defects in the visual field will appear, and it will be possible to outline absolute scotoma, both central and paracentral, and peripheral contractions in the field, in accordance with the location and the degree of involvement of the nerve.

Enlargement of the physiologic blind spot has been much dwelt upon by some authorities, as of diagnostic value in such cases; but the facts as to the limits of the normal blind spot are not yet sufficiently defined to make sure any diagnostic conclusions we would like to draw.

Dr. Reber:—I don't think we have had a case here in the last 4 or 5 years that has interested me more than this case of Dr. Peter's.

I don't know whether he was treated for syphilis or not, but he presents a negative Wassermann. In certain cases of this type a specimen should be taken from the cerebro-spinal fluid. We have also a negative neurologic and rhinologic report in this case. My attitude toward the rhinologic report is that I usually insist that the case be treated on rhinologic grounds, if I think there is any chance of the trouble being due to the sinuses; *and the case generally gets better.* I have come to the belief that only prolonged rhinologic study of these cases is worth while at all. Fuchs' present position is that the rhinologist should be obliged to operate if the ocular symptoms indicate it.

I don't know yet just how much importance the x-ray plays in the diagnosis of these cases for there certainly are variations in size in the normal pituitary body. This man recovered more quickly than I ever saw a syphilitic optic neuritis do. The visual fields are against disease of the pituitary body in this case. There is no denying that we may be dealing with a bizarre syphilitic process.

In Dr. Boehringer's patient the diagnosis rests between hysteria and retrobulbar neuritis. What she tells us about her blindness is absolutely correct. She had some manner of sinus disease, I don't think there is any doubt of that, with the œdema of the lid, the history of the case, the grippe, the peculiar type of pain, the tenderness over the frontal sinus and the reduction in vision. If she had had these things without pain it might have been hysteria. I agree with Dr. Posey when he says he wonders we do not oftener see these ocular conditions in connection with nasal disease. I also agree unreservedly with what he has said in regard to the enlargement of the blind spot. I have had cases of optic nerve disease in my office that did not show any enlargement of the blind spot. On the other hand I have secured most valuable information by this method in certain doubtful cases.

The lesson that stands out from these three cases is the necessity of bearing in mind always the possibility of the nasal origin in obscure ocular disease, and the imperative necessity of a skiagraph in all obscure forms of optic nerve disease.

Dr. Peter:—As to enlargement of the blind spot, I have been making a number of experiments and have not been able to satisfy myself that there is any enlargement of the blind spot in these cases unless there is a very marked change in the optic nerve.

I just want to call attention for a moment to Dr. Boehringer's case. It is typical of sinus disease. Central scotoma coming and going, due to an increased pressure within the sinuses themselves and not an inflammation extending along the vascular sinuses, is suggestive always.

There is a distinct relation between turbinal disease and eye conditions.

DR. D. FORREST HARBRIDGE, Sec'y.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. SHOEMAKER, M.D.,
ST. LOUIS, MO.

TREATMENT OF SCLERITIS WITH TUBERCULIN.

C. N. Spratt (*Journal-Lancet,* June 1, 1912) has treated one case of episcleritis and six cases of keratoscleritis with tuberculin. All of the patients reacted to Koch's old tuberculin in doses of from 1.5 mg. to 10 mg., the lowest febrile reaction being 100.2 F., the highest 102.6 F. A local reaction occurred in six of the cases. Four of the cases were cured in from ten weeks to six months while the other three cases improved under the treatment which was still being continued.

GLAUCOMA, PARTICULARLY IN REGARD TO THE SURGICAL TREATMENT.

John E. Weeks (*Penn. Med. Jour.,* December, 1912) believes that the power of resistance in the eyes of some individuals is lower than normal, so that in simple glaucoma there may be decided cupping of the optic disc in eyes in which the tension is not above normal so far as can be determined. Hence, while tonometers may give very definite information as to the exact tension, yet, from a practical standpoint, the effect increased tension is producing on an eye is better determined by the visual acuity and the changes in the visual fields for form and color than by a tonometer.

Non-operative treatment consists of constitutional and local treatment. The diet should be regulated and any tendency to constipation overcome. As laxative remedies, salines are preferable. If the blood pressure is abnormally high the remedies generally used should be employed to reduce it. For local use the miotics, pilocarpin and eserin are the main remedies used, and they should be employed in strong enough solutions to keep the pupil very small. Dionin may be used for its anodyne effect, but it often does not affect the tension. Massage of the eyeball applied through the upper lid once or twice daily for about two minutes is of value when properly used in connection with the use of miotics. Operation is recommended, on cases that can be kept under observation, "only when diminution in the field of vision for form or color or in the acuity of vision, or both, take place, or an attack of glaucoma occurs, or there is a distressing element of pain, in spite of the non-operative treatment." The writer believes operative procedure is indicated in cases of glaucoma: (1) when the patient cannot be kept under observation; (2) when the field of vision for form or color diminishes or visual acuity diminishes in spite of non-surgical treatment, as indicated by repeated examinations; (3) when an acute attack occurs in spite of non-surgical treatment; (4) when the element of pain is distressing in spite of non-surgical treatment.

He classifies the direct results obtained by operative procedures for the relief of tension in glaucoma as follows: (1) To remove a portion of the vitreous body or to permit the aqueous to escape; (2) to form a permanent communication between the aqueous chamber and the perichoroidal lymph space; (3) to form a permanent avenue for filtration from the anterior chamber to the exterior of the eyeball, (*a*) by the formation of a cystoid scar with incarceration of the iris or other tissue, (*b*) by the formation of a filtering cicatrix without incarceration; (4) to so influence the secretion into the eye that an excess will not occur; (5) to relieve pain by cutting off the sensory nerve supply to the eyeball.

He places under the first division: (1) Posterior sclerotomy, (2) trephining back of the ciliary zone, (3) sclerociliotomy (Hancock), (4) paracentesis of the anterior chamber, (5) anterior sclerotomy (de Wecker). Under the second: (1) Cyclodialysis (Heine), (2) sclerociliotomy, (3) De Vincentiis' operation, (4) sclerochoriotomy (Querenghi). Under the third: (1) Fistulous cystoid cicatrix, (2) anterior sclerotomy, (3) sclerectomy (Lagrange), (4) filtering cicatrix, (5) trephining (Holth, Major Elliott, Verhoeff, Fergus). To the fourth belong: (1) Section of the cervical sympathetic (Abadie), (2) resection of the superior cervical ganglion of the sympathetic (Jonnesco).

To the fifth: (1) Stretching of the supratrochlear nerve (Bailey), (2) laceration of the infratrochlear nerve (Badal), (3) optic cliary neurectomy.

After discussing briefly the foregoing operations, Weeks says: "The value of the operations mentioned in this communication appears to the writer to be as follows:

"Posterior sclerotomy and trephining back of the ciliary zone are operations that give good results in sightless, painful eyes in absolute glaucoma, relieving pain and permitting of the retention of the eyeball without danger of subsequent infection or injury of the fellow eye by sympathy. The writer's experience covers seven cases only. The operation was performed in absolute glaucoma for the relief of pain; it was successful in that the pain was relieved. The patients were under observation for various periods from three months to two years. In two of the cases the tension became about T—1, and remained so.

"Sclerociliotomy (Hancock, Walker) and ciliarotomy (Abadie and Querenghi) are operations which have been strongly advocated by their originators. They are operations with which the writer has had no experience. It is, however, very probable that they give temporary relief, at least, and they may be of permanent value in cases of absolute glaucoma. The writer would hesitate to perform the operation of Hancock in any case because of an open wound through the ciliary zone. Operators of experience are unanimously agreed that paracentesis of the anterior chamber is only of very temporary benefit.

"Anterior sclerotomy (de Wecker and Querenghi) belongs to the same category as paracentesis of the anterior chamber, except that the reduction of the tension of the eye is of much longer duration. If these operations alone are employed, the tension returns sooner or later, usually in from two weeks to three months. The greatest value that the operations possess is as a supplement to iridectomy.

"Bjerrum's sclerotomy, since it contemplates incarceration of the iris, is a different proposition. The opening of the sclera is covered by a conjunctival flap and communication between the anterior chamber and the loose subconjunctival tissue is brought about and made permanent, when possible, by subsequent massage of the eye. The incision must, in many cases at least, cause the anterior chamber and the perichoroidal lymph space to communicate by dividing part of the annular ciliary ligament. This operation raises the question of the desirability of inducing and making permanent incarceration or prolapse of the iris, even subconjunctivally.

"The operations of Rochon-Duvigneaud and de Vincentiis, which contemplate dividing the tissues at the iris angle and making more direct communication between the anterior chamber and Schlemm's canal, must of necessity fail to bring about permanent reduction of the intra-ocular tension in a large percentage of the cases operated upon, although the favorable reports on the results of this operation by Tailer, Sgrosso and others make it appear that a fair percentage of the cases are very materially benefited.

"Cyclodialysis as practiced by Heine is apparently losing favor. The reports of the operators who have practiced this procedure, other than Heine, G. Weinicke, Elschnig and others, indicate that it succeeds in effecting a permanent reduction of tension in approximately fifty per cent. of the cases. A. Knapp writes, 'It can be conservatively stated that cyclodialysis is of value in certain limited conditions; it is indicated in the advanced cases of chronic glaucoma, especially those in which iridectomy has not succeeded in reducing the tension. It cannot in any way replace the classical operation of iridectomy or its recent modifications in incipient glaucoma.'

"The experimental research of Joudine, Wichodzeff and others made on animals demonstrate the fact, in the animals experimented on at least, that the communication between the choroidal space and the anterior chamber is soon closed by a deposition of cicatricial tissue. It is possible that the results of these experiments can be compared only in a limited sense to results in the human eye.

"The operation of Fergus, which differs from that of Heine only in that the opening in the sclera is made by removing a disk 2 to 3 mm. in diameter by means of a trephine, cannot as yet be passed upon, as a sufficiently large number of cases has not been reported. It is evident that its superiority over Heine's operation could result only from a more persistent filtering scar, due to the removal of the disk of sclera.

"Operations that contemplate the incarceration or prolapse of iris, the incarceration of the conjunctiva or other tissue, or the formation of a cystoid scar without adequate covering, as by the conjunctival tissue, are open to the objection that infection may take place at a favorable time days or years after the operation and that sympathetic inflammation may occur. All ophthalmologists of large experience have observed these complications in such cases and have learned to look upon eyes in this condition as possessing a constant menace to vision. Operations that contemplate prolapse or incarceration with adequate conjunctival covering are objectionable because of necessary distortion of the pupil and, in some cases, deformity at the site of the wound. These eyes are not entirely free from danger of subsequent infection, but infection will be extremely rare and the benefits derived from some of the procedures, as for instance that of Holth, may justify the operator in making the operation. However, if the same result can be obtained by operation not complicated by incarceration or prolapse, the procedure is much more desirable. A protected filtering cicatrix without incarceration or prolapse of the iris or other tissue, with or without iridectomy, is a desirable condition to obtain. The endeavors of Lagrange, Holth, Herbert, Elliott and Verhoeff are in the right direction. The writer's experience has been almost entirely with the Lagrange operation. He has records of eighty-four Lagrange operations.

"The cases were, simple chronic glaucoma, 35; subacute glaucoma, 35; acute glaucoma, 7; absolute glaucoma, 2; secondary glaucoma, 5. Thirty-seven of the patients operated upon (33 private and 4 dispensary cases) have been under observation for periods varying from two weeks to four and a half years. The remainder were dispensary cases and were not kept track of. Vision before operation ranged from zero to 20/20. In the cases of chronic glaucoma, twenty in number, all the patients have retained vision as good or better than before operation except five. Of these, nuclear cataract is developing in two, in three the fields have narrowed slightly and vision is reduced. Of the subacute cases, twelve in number, vision has remained good; nuclear cataract is developing in two. The cases of acute glaucoma, two in number, were cured. There was one case of absolute glaucoma in which the pain was relieved; two cases of secondary glaucoma, tension reduced, so far permanently. The three forms of cicatrix described by Lagrange, namely the smooth cicatrix, the dark line at the site of the sclerectomy, and the cystoid cicatrix, have been observed in my cases. The cystoid cicatrix predominates in the chronic cases. * * * * *

"In acute glaucoma the classical iridectomy with the incision in the iris angle suffices to bring about a permanent desirable result in almost every case. It is well to obtain a subsidence of acute symptoms by the use of laxatives and miotics before the operation is performed, if possible, and if sclerotomy can be combined with the iridectomy (Lagrange), the good result will be more certainly obtained."

ÆTIOLOGY AND TREATMENT OF MINERS' NYSTAGMUS.

F. J. Browne and J. R. Mackenzie (*Brit. Med. Jour.,* October 5, 1912), analyzing one hundred cases of this affection, found four important contributing factors in its ætiology. They are: 1, insufficient light; 2, errors of refraction; 3, the straining of the ocular muscles, and 4, the neurotic temperament. Ninety-nine per cent of their cases had been using an inadequate form of light while only one man who used an efficient light suffered with the trouble. Ninety per cent. of their cases had errors of refraction and quite as large a per cent. of the cases were found in men who worked in such positions as threw severe strains on the ocular muscles.

INFLUENCES OF DIONIN UPON PUPILS AND TENSION OF NORMAL EYES.

Franz Toczyski (*Zeitschrift für Augenheilkunde,* July, 1912) finds that dionin first causes a contraction of the pupil, to a greater or less degree, according to the amount of chemosis produced, there appearing to be a definite relationship between the two. This contraction of the pupil lasts a longer or shorter time and is followed by a dilatation, the duration of which seems to have no close connection with that of the miosis. The intra-ocular tension rises after the use of dionin until it reaches a certain height and then falls, sometimes below normal. While as a rule the tension is increased during the time the pupil is contracted, it varies during the period of dilatation, sometimes being increased and other times going below normal.

RELATIONS BETWEEN PERLECHE AND BLEPHARO-CONJUNCTIVITIS CAUSED BY DIPLOBACILLI.

S. Ishihara (*Klinische Monats. für Aug.,* October, 1912) says that perlèche, an eczematous inflammation of the corners of the mouth, caused by the Morax-Axenfeld diplobacillus, is quite common, at least in Japan. As the diplobacilli can readily be transferred from the mouth to the eye where they may set up a typical blepharoconjunctivitis, the importance of curing the perlèche for the prevention of the conjunctivitis is apparent.

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ORIGINAL ARTICLES.

OPTIC NEURITIS DEPENDENT UPON INFLAMMATION IN THE ETHMOID CELLS.*

By M. H. Post, M.D.,
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The recognition in late years of the connection between various eye troubles and inflammations of the sinuses opening into the cavities of the nose, has added very much to the accuracy of ophthalmic diagnosis and to the satisfaction of ophthalmic practice. It may also clear up the ætiology of some of our former cases where the patient was correct in attributing loss of vision to a cause which at the time seemed to us quite doubtful or inadequate.

I have now in mind an experience of my own, where a woman consulted me for an optic neuritis. I treated her for a long time, getting, I think, a fairly good result; sufficiently good to keep her confidence. She referred her trouble to her son having turned a watering hose on her, drenching her clothing with water. She "took cold", and as result of this "cold" she was losing her sight.

I was inclined to regard this as a coincidence, not holding the relation of cause and effect, and to look elsewhere for the true origin of the trouble, suspecting that possibly syphilis had been introduced into the family by her thoughtful and anxious husband. He was a railroad conductor. He denied any luetic experience, but suffered from various indefinite nervous symptoms. I could get no other conditions suggestive of syphilitic infection in his case. This was before the discovery of the Wassermann test.

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*Read at the April meeting of the St. Louis Ophthalmological Society.

I believe now that, as a result of the chilling of this woman's body, an inflammation in the sphenoid or ethmoid cells was lighted up; secondary to that an optic neuritis had supervened, and that the woman's theory of the ætiology of the disease was correct, rather than mine.

So many cases of optic neuritis depending upon inflammation of the ethmoid or sphenoid sinuses have been reported, that in this condition of the optic nerves I make a practice of having the ethmoid and sphenoid cells investigated, and where they are found to be inflamed I feel justified in considering the sinusitis as the cause of the optic neuritis.

Notwithstanding our confidence that this explanation is correct from what we read of the experience of others, a typical case in our own experience increases our confidence, and makes us feel that one more of the difficult and obscure points in ophthalmic ætiology has been cleared up. And this confidence gives us greater satisfaction and pleasure in the practice of our speciality.

Having recently been so fortunate as to have such a case come into my care, I think it may be of interest.

August 1, 1912, a boy 16 years old, consulted me on account of failing vision and headaches. The family physician, John F. Harrison, of Mexico, Mo., came with him, which makes the history of the case particularly reliable.

While the patient was a boy in years, he was a man in physique. His vision was 1/192 O.D., 3/120 O.S. The ophthalmoscope showed a swelling of 4 d O.D., 6 d O.S.

The history of the case was, that five weeks before consulting me, following a period of five days, during which he had slept on an average only an hour and a half every twenty-four hours, his sight began failing. Two and a half weeks later the front part of his head began aching, this gradually growing more severe until the pain became so intense that he was unable to sleep at all for five consecutive nights, and a hypnotic had to be given to induce sleep.

There had been some nausea but no vomiting. He had also had some fever, but the temperature did not go above 102°. When I first saw him his temperature was 100.4, pulse 65.

He had been using "eye drops" for his failing vision, obtained from a druggist, till he consulted Dr. Harrison, who recognized the seriousness of his condition and brought him to me.

I found that there was considerable sensitiveness at the upper inner angles of each orbit. From this sensitiveness and from the location of the headache, and the swollen condition of the optic discs I made a diagnosis of an inflammation of the frontal, ethmoidal and possibly sphenoidal cells; of course, subject to what the rhinologist might find. Naturally I was very much alarmed about the condition of the patient, especially as I had seen two deaths rapidly supervene on such conditions; once in the case of a man brought into St. Luke's hospital, with pain in his forehead and eye protruding, who was referred to me as an eye case. He died within a few hours after admission. Again in the case of one of my personal friends, who was suffering from severe headache, and was in a semi-comatose condition when I saw her, I advised the family physician in charge of the case to call in a rhinologist, but he did not do so, and this patient also died in a few hours. Remembering these cases, I advised Dr. Harrison to take the case immediately to a very competent nose and throat man, who reported that the findings were negative, but that he would like to see the patient again. In view of this answer and fearing that we might have a cerebral tumor to deal with, Dr. Harrison and I decided to consult a neurologist. Accordingly we took the patient to Dr. M. A. Bliss, who said there was no tumor. With this excluded, it was decided to have the nose and sinuses again examined. Through a misunderstanding of the relation of the case to the nose and throat man, who had already made an examination and had asked to examine the patient again, the case was referred to Dr. Hanau Loeb. Dr. Loeb examined the patient three or four hours after the other rhinologist had examined and treated him. Dr. Loeb found evidences of an ethmoiditis and advised an immediate operation.

The next morning an examination of the eyes, made at the Jewish Hospital by Dr. Shahan, showed little if any change. Later in the morning the post ethmoidal cells were operated on by Dr. Loeb.

Twenty-four hours later, the report was a comfortable night, patient better in all respect. Vision had risen from 1/192 to 3/75 O.D. and from 3/120 to 3/12 O.S. Highest part of the disc O.D. seen with +1. d. sph., the macula emmetropic. The highest part of the disc O.S. seen with +3. d. sph., the macula emmetropic. There were no hæmorrhages nor other lesions in any part of the fundus of either eye. The examination on August 3rd, the morning after the operation, was made by Dr. Wm. E. Shahan under a mixture of cocain and euphthalmin one per cent. each.

August 8th: V. 20/24, nearly normal either eye; disc O.D. swollen to 3 d., that of O.S. to 4 d. Bichloride of mercury one-twelfth grain, to be taken three times a day, was prescribed, and the patient was sent home to report in two weeks.

August 29: O.D. with +1. d. cyl. ax. vert. V. 20/12; O.S. with +1. d. cyl. ax. vert. V. 20/19.

A most rapid improvement in three weeks. The ophthalmoscope showed about 1 d. of swelling of disc O.D. or O.S.

September 18th. The patient had had no headaches lately. For the last two weeks had been "working in the field." With correction of August 29th, V. 20/15 O.D. or O.S. Discs are seen best with +1. d. sph.

When last seen, December 14th, 1912, patient was well. With +0.5 cyl. ax. vert. V. 20/12 either eye, and he read pleasantly with this correction.

The form fields, some of them taken as early as August 8th, 1912, were normal.

An important lesson to be drawn from this experience is that the rhinologist must be allowed plenty of time to make a diagnosis in these cases. I presume the examination made by the first rhinologist, and the shrinking of the tissues following the use of cocaine at the first examination, opened the passages between the ethmoidal and sphenoidal sinuses and the nose, allowing the pus contained in the sinuses to escape into the nose showing the condition of the sinuses and clearing up the diagnosis. Probably if the patient had returned to the physician who first examined him, as was requested, that physician would have found the same condition as was found by Dr. Loeb.

A CASE OF OCULAR TUBERCULOSIS WITH NOTABLE ASTIGMATIC VARIATIONS.*

By W. E. Shahan, A.M. M.D.,
ST. LOUIS, MO.

It is difficult to find references, either in text books or journals, to astigmatic variations, occurring during the course of disease of the chronic, frequently painless, nature which ocular tuberculosis may assume. And yet the over-looking of such variations, either because of the tedium of their correction, or because of intense preoccupation with the diseased tissues, may result in considerable mental and physical distress to the patient, and cause unexplained marked variations in visual acuity.

This patient, a vigorous, well nourished boy, 14 years of age, was brought by his parents, August 14th, 1911, to consult my senior associate, Dr. John Green. Owing to his absence, the management of the case at first fell to me and was later conducted by us jointly. The family history was good, with the exception of an aunt who had been treated for tuberculosis, and of a cousin who had "gone blind from some slow disease."

His history and condition were as follows: O.D. inflamed without pain or discharge 2 months; O.S. 6 weeks. Had been under care of three ophthalmologists. Pupils dilated ad max. Marked conjunctival and ciliary injection O.D.; same condition less marked O.S. Without glass V. 20/75 O. D.; 20/75 O.S. Was wearing O.D. +0.62 cyl. ax. vert.; O.S. +.75 cyl. ax. vert.; prescribed by an ophthalmologist three weeks previously. Media clear and fundus normal O.D. and O.S. No mydriatic was used that day and on the following day there was out-spoken iritis with adhesions O.D. By the afternoon of the same day these adhesions yielded to treatment with atropine.

Since the treatment of this case extended over a period of more than a year and numerous refractive measurements were made, a brief description of the mode of making these measurements will be given. First, an ophthalmometric measurement was made by means of a Kagenaar model of Javal's ophthalmometer. The total refraction was then determined by means of astigmatic dials and trial case measurements. The dials used were mainly the dials A.P.U. and V., described by Dr. Green in the Transactions of the American Ophthalmological Society, Vol. II, part IV, 1878. The dial P has radiating lines at intervals of 30°, the width of each line subtending an angle of 2 minutes at 8 meters. This affords very distinct lines with large contrast and simple arrangement, so that patients with only moderate ability in perception of differences are able to indicate the dominant meridian in cases of 0.25 D. or over, provided they are not in a state of mental perturbation. The principal meridian having been determined to within 7° by shifts in the position of the dial P, the dial V was then employed for locating its exact position. In this patient perception of luminosity difference was unusually acute, being measured by about 0.12 D. He was easily able to detect differences in the brightness of the wedges if they were 2° or 3° away from a symmetrical position on either side of the principal meridian. After the accurate location of the principal meridian, the dial U was used and the two arms of the cross made to appear alike by successive cylindric additions. Maximum visual acuity was then obtained by ± spherical additions, and as this also increases acuteness of difference perception, the dial U was again referred to and additional seeming differences in the arms of the cross eliminated.

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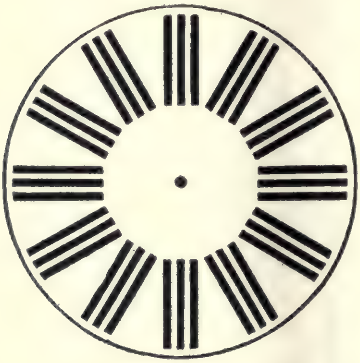
*Read before the Ophthalmic Section of the St. Louis Medical Society, May 7, 1913.



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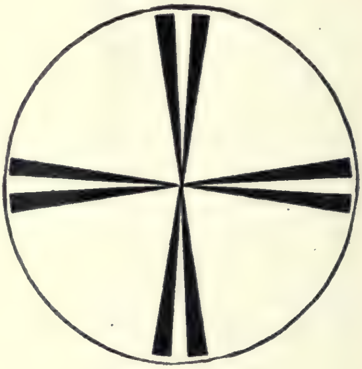

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If now the astigmatic foci were accurately equalized, a weak cylinder, say +0.25 D applied to the correction found, would cause either of the principal meridians to become the dominant one, so that either arm of the cross would be made to appear "blacker", "more distinct", or "printed with blacker ink", than the other. This artificial reversal at will of the principal meridian is to me an *experimentum crucis* in the equalization of astigmatic foci, and I am never satisfied with a correction in which I cannot obtain it except in cases with unusually dull difference perception, when other measures have to be resorted to. With the completion of these measurements a rapid checking of results was made by empirical methods dependent upon the relation of visual acuity to spherical and cylindric additions and upon variations in the position of the axis of the cylinder.

This, with slight variations, is the routine manner in which all measurements noted below were made. The general clinical picture now, August 15th, 1911, was one of conjunctival hyperæmia and circumcorneal injection O.D. and O.S. with out-spoken iritis and slight adhesions O.D. In all measurements noted below the ophthalmometric measurement is placed on the left and the total correction on the right.

August 15: O.D. As. 3.25 Mc vert.; —1.50 sph +3.00 cyl. ax. vert. V. 20/24. O.S. As. 2.00 Mc 100°; +2.00 cyl. ax. 105° V. 20/15+.

August 21: Internal therapy with sodium salicylate and aspirin instituted on a theory of rheumatism.

August 28: O.D. As. 2.25 Mc vert.; +1.75 cyl. ax. 85° V. 20/19. O.S. As. 2.25 Mc 105°; —0.75 sph.+2.25 cyl. ax. 95° V. 20/15+.

September 1: Several small deposits noted on posterior surface of cornea O.D.

September 4: Fine gray streak extending from below and from temporal side half way to center of cornea. Also small brownish conical protuberance extending from nasal edge of iris upon lens O.D.

September 8: Increased clouding O.D. Also fine streak extending upwards across cornea O.S. With a +20 D. lens clouding appears as numerous fine gray points on the posterior surface of the cornea.

October 5: Conical protuberance noted September 4th gone. Routine taking of temperature 4 or 5 times a day instituted.

October 28: O.D. As. 1.25 Mc 105°; +0.50 sph. +0.87 cyl. ax. 100° V. 20/12. O.S. As. 2.50+ Mc 70°; —0.75 sph. +2.50 cyl. ax. 75° V. 20/12.

Temperature has ranged around 99° since October 5th. Von Pirquet test made by Dr. A. E. Taussig.

October 29: Vigorously positive reaction to Von Pirquet test. Tuberculin therapy instituted with very small initial dosage. Salicylates stopped.

November 13: O.D. As. .75+ Mc 105°; +0.50 sph. +0.75 cyl. ax. 100° V. 20/12. O.S. As. 3.00 Mc 73°; —1.00 sph. +2.87 cyl. ax. 73° V. 20/15+.

Fundus normal; media clear O.D. except for a thin nebula on temporal side of cornea. Fundus normal. Counted 26 dots on posterior surface of cornea O.S. with +20 D. lens behind ophthalmoscopic mirror.

November 18: More precipitation on posterior surface of cornea O.S. Not collected in triangular form below but scattered discretely over surface.

November 30: Slight local tuberculin reaction.

December 7: O.D. very quiet; atropin instillation O.D. discontinued.

December 10: Deposits on posterior surface of cornea O.S. completely gone.

December 17: O.D. As. 0.50+ Mc 120°; +0.50 cyl. ax. 100° V. 20/12. O.S. As. 4.50 Mc 75°; —1.50 sph. +4.25 cyl. ax. 80° V. 20/15+. O.S. quiet; atropin instillation omitted.

December 23: O.D. As. 0.5 Mc 100°; +0.50 cyl. ax. vert. V. 20/12. O.S. As. 4.75 Mc 70°; —1.50 sph. +3.50 cyl. ax. 73° V. 20/12.

There is now a grayish infiltration from the temporal side of the cornea O.S. It has a blunt apex 1½ mm. broad and extends to within 1 mm. of the centre of the cornea. Within it are small dense gray dots. Strong Coddington lens shows minute bloodvessels extending from its base for 2½ mm. upon cornea. It is probably directly responsible for the increase in corneal astigmatism O.S.

January 1, 1912: New inflammatory focus developing at nasal side O.D. involving conjunctiva and probably superficial layer of sclera. Gray area on cornea O.S. generally thinner. No deposits on posterior surface of cornea O.D. or O.S.

O.D. As. .5+ Mc vert.; +.5 cyl. ax. vert. V. 20/15+. O.S. As. 3.75+ Mc 75°; —.75 sph. +3 cyl. ax. 75° V. 20/12—.

January 5: There are numerous small translucent trachomalike granules on nasal side of conjunctiva and on surface of caruncle O.S. These granules are freely movable with the conjunctiva.

January 11: O.D. As. 1.+ Mc 75°; +.62 ax. 75° V. 20/12—. O.S. As. 3.25 Mc 75°; —1.25 sph. +3 cyl. ax. .75° V. 20/15+.

Only one dense gray point in corneal area of grayish infiltration O.S., noted December 23d.

January 28: O.D. As. 1.5 Mc 55°; +1.25 cyl. ax. 60° V. 20/15—. O.S. As. 3.25 Mc 85°; —1. sph. +3 cyl. ax. 80° V. 20/15+.

Inflammatory focus at nasal side O.D., noted January 1st, now ridge-like with its summit along the line of contact of the closed lids. At the termination of this ridge at the limbus is a small well-defined nodule. Along the summit of the ridge are several nodules in process of retrogression.

February 3: Nodule near limbus O.D., noted January 28th, is pitted in the top and entire swelling is diminishing. Trachoma-like granules O.S. scanty.

February 14: O.D. As. 2.75 Mc 43°; —.25 sph. +2.25 cyl. ax. 43° V. 20/15+. O.S. As. 3.25 Mc 85°; —.75 sph. +2.75 cyl. ax. 80° V. 20/12.

There is a yellowish fleshy infiltration O.D. extending about 1 mm. upon cornea and 5 mm. along nasal side of limbus. This is an extension upon the cornea of the ridge-like swelling noted January 28th.

February 17: O.D. As. 2.50 Mc 60°; —.25 sph. + 1.75 cyl. ax. 55° V. 20/12. O.S. As. 3.00 Mc 85°; —.75 sph. +3.00 cyl. ax. 85° V. 20/12. +

February 27: O.D. As. 2.25 Mc 73°; +2 cyl. Mc 70° V. 20/12. O.S. As. 3.00 Mc 83°; —.75 sph. +3.00 cyl. ax. 85° V. 20/12.

March 5: O.D. As. 2.25 Mc 80°; —25 sph. +2. cyl. ax. 75° V. 20/12. O.S. As. 2.75+ Mc 85°; —.75 sph. +3 cyl. ax. 85° V. 20/12.

March 17: O.D. As. 1.75 Mc 85°; +1.50 cyl. ax. 75° V. 20/12. O.S. As. 2.50 Mc 85°; —.75 sph. +2.50 cyl. ax. 87° V. 20/12.

March 27: O.D. As. 1.75 Mc 90°; +1.50 cyl. ax. 85° V. 20/15. O.S. As. 2.25+ Mc 90°; —.75 sph. +2.50 cyl. ax. 87° V. 20/15.

March 28: To this date the clinical course has been one of gradual subsidence of all inflammatory symptoms. The ridge-like swelling with its slight corneal invasion O.D. has about disappeared. Now a new inflammatory area appears on the lower nasal side of the conjunctiva O.S. There are trachoma-like granules on this, but it does not invade the cornea.

April 5: O.D. As. 1.50 Mc vert.; +1.25 cyl. ax. 85° V. 20/12. O.S. As. 1.25 Mc 120°; +.50 sph. +1. cyl. ax. 115° V. 20/12.

This astonishing change in the astigmatism O.S. is probably due to a gradual increase in the intensity of the new inflammatory focus.

April 6: Slight haziness of cornea O.S. bordering inflamed area in lower nasal side of conjunctiva.

April 14: O.D. As. 1.75 Mc 90°; +1.25 cyl. ax. 95° V. 20/12.
O.S. As. 4.25 Mc 145°; —1. sph. +2.25 cyl. ax. 110° V. 20/15.

There is now a grayish infiltration of cornea O.S. extending from lower nasal limbus to within 1½ mm. of centre of cornea. This grayish area contains within it small circular dots of a denser gray and is near enough to the corneal centre to interfere with the reflection of the mire and produce an apparent corneal astigmatism 2 D greater than the total astigmatism. Fundus normal, no "keratitis punctata."

May 5: O.D. apparently well, O.S. generally better.

June 6: O.D. As. 1.50 Mc 100°; +1.50 cyl. ax. 90° V. 20/12.
O.S. As. 2.25 Mc 90°; +2.25 cyl. ax. 100° V. 20/12.

O.S. now very quiet. Bloodvessels have reached out and encircled dense gray dots in area of infiltration. There is an especially large gray dot near the apex of this area. It is surrounded by fine bloodvessels and is retrogressing.

June 23: Marked local and general reaction to tuberculin injection of yesterday. The dosage has now reached about one-fiftieth mmg.

June 27: Vigorous local and general tuberculin reaction to injection of yesterday. Temperature 100.6 F. Inflammatory symptoms greatly increased O.D. and O.S. Patient in evident distress. This was the last tuberculin injection given.

July 19: O.D. As. 1.50 Mc 100°; O.D. +1.25 cyl. ax. 100° V. 20/12. O.S. As. 4.00 Mc 87°; O.S. +2.50 cyl. ax. 90° V. 20/15+.

Some distortion of image reflected from lower part of cornea O.S. Tuberculin reaction of June 27th not entirely subsided.

July 22: All active inflammatory symptoms gone O.D. and O.S. Patient given simple collyrium and sent home to report in September.

September 3: "No trouble."

O.D. As. 1.5 Mc 83°; +1.25 cyl. ax. 93° V. 20/12. O.S. As. 3.75+ Mc 90°; +3. cyl. ax. 100° V. 20/12.

O.D. entirely quiet, O.S. entirely quiet except for a small pale rose colored area between inner limbus and caruncle. Area of infiltration lower nasal quadrant of cornea O.S. now completely inactive. The blood vessels have atrophied and the dense gray dots are now filled with a chalk-like deposit and surrounded by a thin areola of scar tissue. The scleral conjunctiva is nowhere injected but still shows O.S. a few trachoma-like granules. The patient has gained 55 pounds in weight during the year. This is probably largely natural growth.

January 1, 1913: O.D. As. 1.50 Mc vert.; O.D. +1.25 cyl. ax. 93° V. 20/12. Os. As. 3.25 Mc 88°; O.S. +2.75 cyl. ax. 102° V. 20/12.

O.D. appears completely cured. No scars or vascularization of cornea. O.S. still shows a few trachoma-like granules in conjunctiva to nasal side and very small ones along lower limbus. Eyes generally quiet. Sometimes "get a little red and sensitive to light." Chalk-like deposit, noted September 3rd, now yellowish and apparently dissolving. Scar O.S. very thin with very fine vessels around chalk-like deposit. Patient has lived much out of doors. General health excellent. No evidence of tuberculosis in any other part of the body has ever been obtained by Dr. Taussig in numerous examinations. The most important changes in the total refraction are shown in the following table:

	O. D.				O. S.			
Date	Sph.	Cyl.	Ax.	V.	Sph.	Cyl.	Ax.	V.
1911.								
Aug. 15,	—1.50	+3.00	90°	20/24		+2.00	105°	20/15
Aug. 28,		+1.75	85°	20/19	—0.75	+2.25	95°	20/15
Oct. 28,	+0.50	+0.87	100°	20/12	—0.75	+2.50	75°	20/12
Nov. 13,	+0.50	+0.75	100°	20/12	—1.00	+2.87	73°	20/12
Dec. 17,		+0.50	100°	20/12	—1.50	+4.25	80°	20/15
Dec. 23,		+0.50	90°	20/12	—1.50	+3.50	73°	20/12
1912.								
Jan. 1,		+0.50	90°	20/12	—0.75	+3.00	75°	20/12
Jan. 11,		+0.62	75°	20/12	—1.25	+3.00	75°	20/12
Jan. 28,		+1.25	60°	20/15	—1.00	+3.00	80°	20/12
Feb. 14,	—0.25	+2.25	43°	20/15	—0.75	+2.75	80°	20/12
Feb. 17,	—0.25	+1.75	55°	20/12	—0.75	+3.00	85°	20/12
Feb. 27,		+2.00	70°	20/12	—0.75	+3.00	85°	20/12
Mar. 5,	—0.25	+2.00	75°	20/12	—0.75	+3.00	85°	20/12
Mar. 17,		+1.50	75°	20/12	—0.75	+2.50	87°	20/15
Mar. 27,		+1.50	85°	20/15	—0.75	+2.50	87°	20/15
April 5,		+1.25	85°	20/12	+0.50	+1.00	115°	20/12
April 14,		+1.25	95°	20/12	—1.00	+2.25	110°	20/15
June 6,		+1.50	90°	20/12		+2.25	100°	20/12
July 19,		+1.25	100°	20/12		+2.50	90°	20/15
Sept. 3,		+1.25	93°	20/12		+3.00	100°	20/12
1913.								
Jan. 1,		+1.25	93°	20/12		+2.75	102°	20/12

In every test precaution was taken by numerous changes in number and variety of test letters and objects to eliminate all elements of memory subconsciousness or otherwise, so that the above statements of visual acuity may be depended upon as representing fact as rigidly as it is possible to obtain it by subjective testimony.

CONCOMITANT CONVERGENT SQUINT; VALUE OF CORRECTION GLASSES IN ITS TREATMENT.

D. F. Harbridge (*N. Y. Med. Jour,* Jan. 25, 1913) refers to the theories of Donders and Worth as to the cause of concomitant convergent squint. Concerning the latter he thinks the loss of the fusion faculty is more likely to be a result than the cause of squint. He is so strongly impressed by the almost constant association of hyperopia, inducing additional accommodative effort, with esotropia, that he is quite firmly of the opinion that it explains the majority of the cases of convergent squint. Permanent monocular and periodic squint are the two forms that respond most favorably to treatment by the wearing of full correcting lenses. In alternating squint the condition is often influenced but little by the wearing of glasses. The proper glasses should be adjusted early in these cases, as early as the second year of the child's age. He condemns as especially pernicious the advice "to wait and the child will outgrow the defect." Where the wearing of the proper glasses does not early correct the deviation the blurring of the vision of the fixing eye by the use of atropin is advised. Harbridge's rule is to have the child wear a darkly smoked lens of the strength of the child's correction over the atropinized eye. The atropin is used in the fixing eye for one month, then stopped two weeks, and, if necessary, then used another month. If necessary to continue this treatment very long it is advisable to stop the atropin in the fixing eye and use it in the deviating eye for one or two weeks. These patients should be kept under observation until they are six or seven years of age, when the fusion faculty is usually fully established.

MEDICAL SOCIETIES

OPHTHALMIC SECTION.

St. Louis Medical Society.

March 5, 1913.

Two Operative cases (a) Frost-Lang Operation. (Implantation of Glass Ball in Tenon's Capsule.) (b) Heisrath's Excision of the Tarsus. Presentation of patients.—By Dr. John Green, Jr.

This patient, a little girl, came to the Children's Hospital about a month ago. She is, as you see, a victim of ophthalmia neonatorum. In the right eye the lower portion of the iris is engaged in a corneal scar. There is an anterior polar cataract. The left eye was distended and sightless and painful at times, so I decided to enucleate it. I thought it best to insert a solid glass sphere into Tenon's capsule because, as we know, after simple enucleation in the children there is apt to be failure of development of the bony structures of the orbit. I hope that the implantation of the solid sphere may prevent this secondary failure of osseous development. Dr. Greenwood, of Boston, has done this operation in about 75 cases and it was on his recommendation that I first undertook it. The technique is exactly as Dr. Greenwood outlined it to me. The conjunctiva is incised in the usual way, each rectus tendon is caught up by a Prince's advancement forceps, the conjunctiva is well separated from the muscle, and the muscle from the globe. A silk suture is then passed through each rectus tendon. The eyeball is very carefully enucleated and all bleeding checked. That is a very important point. A purse string catgut suture is then put around the edge of Tenon's capsule. An assistant places the glass ball (about the size of a small marble) in the cavity, holds it in with gauze and the purse string suture is tied. The glass ball is now completely covered, and the rest of the operation consists simply in tying the external to the internal rectus and the superior to the inferior and then taking three or four interrupted sutures to approximate the conjunctiva. The reaction after the operation varies very greatly. In one of my cases there was tremendous swelling and pain, controlled in the course of 48 hours by cold applications. In the others the reaction has been no greater than what usually follows a simple enucleation. This operation was performed only thirteen days ago. You will notice that there is much less sinking in of the upper eyelid than is the case after simple enucleation. The rotations of the prothesis are better than after simple enucleation in the lateral direction, but not in the vertical direction. The child has only worn an artificial eye for a day, so we may hope that the cosmetic result will eventually be better than at present.

The second patient is a boy on whom I have performed the Heisrath excision of the tarsus. He has been treated at the various eye clinics for trachoma for the past four or five years with only temporary improvement. He was just entering the cicatricial stage. No pannus. Last summer my first experience with this operation was an encouraging one. A young woman came to me with a very bad trachoma of seven or eight years' standing, extensive pannus and ulceration; in a word, the usual picture of a badly neglected trachoma. I excised the tarsus in both eyes and in six weeks all the ulcers had healed, the pannus had cleared up, vision had greatly improved and at last reports, five months after the operation, there were no signs of inflammation in the eyes. This operation is gaining a great deal of favor in New York. Dr. Woolton and Dr. Claiborne are ardent champions of this procedure. The first man in this country to speak of it and to advocate it with favor was Dr. Casey Wood of Chicago. I suppose you are all familiar with the technique of the operation. The lid is everted and these forceps applied (designed by a nurse at the New York Eye and Ear Infirmary). Another forceps designed by Dr. Claiborne may serve a bit better. The tarsus is clamped at its lower edge and the lid lifted up, thus displaying the superior fornix. The incision is made along the upper edge of the tarsus, and goes through the conjunctiva. The conjunctiva is then dissected backward towards the fornix and a little on to the globe and three double armed sutures are inserted. The clamp is removed. For the second part of the operation, I use Dr. Ewing's excellent lid forceps. The second incision cuts through the tarsus from the outer to the inner angle, 3 mm. back from the ciliary border. The aim is to make the ends of this incision curve around and meet the ends of the first incision. For the freeing of the tarsus I use a thin knife rounded at the end. The lid is replaced in normal position, the position of the sutures is carefully noted in order that they may be brought out through the skin of the lid at a point opposite to the point of insertion. I have followed Claiborne's suggestion and brought out the stitches through the skin of the lid rather than through the anterior remnant of tarsus, as advised by Heisrath and other operators.

DISCUSSION.

Dr. Wiener: I have never seen any advantage in introducing an artificial globe, either glass or metal. I see a great many objections. It is rather early to remark upon this case as the operation was recent and there is still quite a bit of swelling, but it appears to me that there is very much less excursion in any direction of this eye than in an eye where an evisceration has been done or an enucleation. And in an eye where evisceration has been done and the muscles are intact and in place in the sclera, it seems to me that there is not any more sinking in of the socket or of the upper lid than in this case, especially with a reform eye. Then besides, I think the patient is infinitely safer without anything introduced in that orbit. In the second case I do not see any special advantage gained in removing the tarsus, and I think it is a mistake to have the tarsus removed. There are very few cases that do not respond to local treatment, and I think I would rather have it take longer and have a better ultimate result than remove the tarsus immediately.

Dr. Charles: About the first case, the thing I like is that operation is especially adaptable to children because it would probably stimulate growth of the orbit, giving it a chance to develop, which it might not perhaps have otherwise. I would like to know if anybody has seen these glass balls after several years? Would they become rough in the course of time? Some of the constituents of glass (for example, sodium) are soluble. As to the second operation, it seems to me it is especially applicable in these rare cases where other treatment does not seem to avail. We, all of us, have an occasional case always with greatly thickened tarsus which suffers relapse after relapse, just as we believe that it is about well.

Dr. Jennings: I have had some experience in the use of glass globes, but on account of the reported danger of roughening after a series of years, the last ones I have used were made of gold. I agree with Dr. Wiener that if an evisceration is done you get a very movable, satisfactory stump. When I make the incision I pull the muscle forward and tie it to the conjunctiva on that side. Of course, I believe that after every enucleation the muscles should be attached to the front portion of the stump, and not be allowed to fall back. In regard to the second case, it seems to me that the removal of the tarsus would be of benefit in those chronic forms of trachoma with entropion, but I should not care to remove it as long as the case was progressing nicely, and there was no particular amount of entropion.

Dr. Green, in closing: I know nothing about the erosion of implanted glass balls. Have you had any experience with them actually coming out? Dr. Jennings replied no. Dr. Sweet, of Philadelphia, recently reported a series of cases in which he had done the Frost-Lang operation, using metal (platinum and gold) balls. He followed up his cases carefully to determine, if possible, any bearing the operation might have on the subsequent development of sympathetic irritation or inflammation and was able to satisfy himself that no such relationship existed. The present case is perhaps not a fair test of the operation. The motility of the globes is and has been defective since birth. (Recall that the patient has been practically blind all her life.) We must remember, too, that the operation was done only thirteen days ago and the child has been wearing the glass eye only one day. No doubt the cosmetic effect would be better when the prothesis has been worn longer. In one of Dr. Greenwood's cases, the cosmetic result was so perfect that one could not tell at a distance of a few feet which was the natural and which was the artificial eye. There seems to be quite a difference of opinion as to the degree of motility after these operations. Dr. Sweet, in his series, found that the motility was distinctly greater in all directions than after a simple enucleation. In regard to Heisrath's operation. This operation has been performed by Dr. Kuhnt, of Koenigsberg, more extensively than by any other surgeon. When first taking up his work in a trachoma infected district, he found that many patients who came originally to his clinic would soon drift away and on seeking an explanation for these defections he found that his patients were going to another clinic to have the tarsus removed, and they were quickly relieved of all symptoms. He was therefore practically driven to perform this operation as a means of saving the prestige of his clinic. It seems to be the consensus of opinion of those who have performed this operation most frequently that there is a very positive indication for it. The case presented had been under treatment for several years, had been subjected to several operations, and in spite of all presented all the earmarks of a progressive trachoma.

Hyalitis caused by (a) Pus-absorption and (b) by Intestinal Autointoxication.—By Dr. J. W. Charles.

Appeared in the March (1913) number of this Journal.

A case of Bitemporal Hemianopsia. (Presentation of Patient).—By Dr. Julius H. Gross.

Spiller, in Posey and Spiller, on the question of Tumors of the Pituitary Body, states:

"Tumors of the pituitary body not infrequently cause bitemporal hemianopsia, which later may give place to blindness. Choked disks may be associated with tumor of this part of the brain, but not infrequently the optic neuritis is of a mild grade or there may be optic atrophy from the pressure on the chiasm without previous neuritis. Polyuria and polydipsia, even diabetes mellitus, have been observed as signs of such a growth. Acromegaly has been found so frequently in cases in which the pituitary body was enlarged that some relation between this disease and the alteration of the pituitary body probably exists. Sufficient cases, however, have been reported to show that tumor of the pituitary body does not always cause acromegaly. Bitemporal hemianopsia is a common sign of acromegaly. Bitemporal hemianopsia can be caused only by a lesion at the chiasm."

Mrs. W., age 64, came to the O'Fallon Eye Clinic about 6 years ago with the following history: About two years ago while out walking with some friends she noticed that objects appeared double, and that she could see only one-half of the object. She consulted a prominent oculist who treated her for some time; the diplopia left, but her fields did not improve. At that time her vision was O.D. V=10/120; O.S. V=18/19. The vision in the temporal sides of both fields, excepting a small portion adjacent to the center of the field, was gone. The papillæ were a grayish white, the vessels of normal size, very much as they now appear. Not any swelling. There is nothing in the patient's past ailments having any connection with her present trouble, except that goitre came on at the age of 19.

Present condition: The patient feels well. Has normal appetite. Sleeps well, perhaps a little more than would be considered normal at her age She has excessive thirst. Perspires easily on left side of face and body. The general physical examination shows that she still has goitre, the left lobe especially is large, although she states that it is much smaller than formerly. The left knee is stiff, an old trouble which has not any connection with the present ailment. There is present a fair percentage of sugar in the urine.

Condition of eyes: O.D. V=nil; O.S. V=18/19. The temporal side of field, except a small part near the fixation point, is dark. There is interlacing of the red and green color fields. The pupils respond when light is thrown on the seeing part of the left retina. Wernicke reflex sign present. The pupils contract in accommodation. Movements of the globes are normal.

The bitemporal hemianopsia would point to some trouble in the anterior part of the optic commissure, in the region of the sella turcica, and pituitary body. Signs and symptoms usually present in tumor of the pituitary body and absent in this case are: headache, nausea and vomiting, convulsions, vertigo, choked disk and acromegaly.

DISCUSSION.

Dr. J. F. Shoemaker: Dr. Gross's patient was seen by me in September, 1906. She had at that time complete bitemporal hemianopsia and stated that the trouble had begun a year previously. When I first saw her the vision was 18/24 in the right eye and 18/19 in the left, unimproved with lenses. Mercury, potassium iodid and strychnin were tried, but did not improve the condition. She was later referred to the clinic at the O'Fallon Dispensary. Several years later I had an X-ray taken of her head which failed to show any evidence of pituitary involvement, the sella turcica appearing entirely normal. Diseases of the pituitary body may cause different symptoms, depending upon whether the secretion of the gland is increased or decreased. When there is hypersecretion the body growth is likely to be stimulated excessively, causing gigantism in the young, and acromegaly in the adult. When the secretion is much diminished there is likely to be a rapid accumulation of fat and a stunting of the growth of the body, particularly of the sexual organs in the young, and in adults atrophy of the ovaries and testes resulting in cessation of the menstrual flow in women and impotence in men. The bitemporal hemianopsia in this case made me suspect a growth involving the pituitary body, but she had none of the symptoms of pituitary disease except the hemianopsia. It is of course possible to have a tumor in this region which does not involve the pituitary body, but which, nevertheless, presses on the optic chiasm. Exception must be taken to the statement that bitemporal hemianopsia can be caused only by disease of the optic chiasm. A growth in front of the chiasm, between the optic nerves could so press against the inner sides of the nerves, without touching the chiasm, as to produce the same ocular symptoms as if the pressure were against the front part of the chiasm. At least one case of this kind has been reported.

Dr. Wiener: I have some interesting charts of bitemporal hemianopsia. The first patient presented himself for treatment early in January, 1911; when he came he was complaining of dimness of vision, the eyes being sensitive to light and suffering from seemingly rather an acute condition We found his vision to be 1/100 in the left and 1/300 in the right His field showed an almost complete bitemporal hemianopsia. This was taken on the 21st of January, 1911. This patient was treated by Dr. Wolfner and myself and was given a small dose of atoxyl; on February 24th, more than one month later, the fields were again taken and showed a marked increase in size, while his vision had increased to 14/80 in the right eye; and then on April 29th, 1912, the last time we saw him in the office, the fields were taken again and they were found to be almost normal as here shown. His vision was 14/50.

The second patient came to the Eye Clinic of Washington University; his fields were taken on the 8th of January, this year, and showed a bitemporal hemianopsia. This patient was referred to the surgical department, an X-ray was taken, and a diagnosis of pituitary tumor was made and a decompression operation was made through the nasal route. These are the fields taken at the hospital. The patient shows marked improvement.

Dr. Gross, in closing: I would only like to say that Dr. Shoemaker's criticism should have been directed at Dr. Spiller, as it was Dr. Spiller's statement, taken from Posey and Spiller's book, "The Eye and the Nervous System," that "bitemporal hemianopsia can be caused only by a lesion at the chiasm."

A Protractor for Use with the Single Cell Trial Frame.—By Dr. A. E. Ewing.

Dr. Ewing presented a protractor for use with the single cell trial frame which consists of two circles made up of short radiating lines of different lengths to represent the one, five and ten divisions of the circle. The proximal ends of the five and ten degree divisions rest on an imaginary circle, which is the size of the outer edge of the 38 mm. ring of the trial lens, while the distal ends of the degree divisions rest on the inner edge of the mounting. For further accuracy in centering, the mounting across a vertical and horizontal lines, each 10 mm. long, is placed at the center of each of the circles. The circles are placed 21 mm. apart with their horizontal meridians in the same line and at their upper margin a horizontal dotted line is drawn tangential to both circles. The circles are designated by "R" for right and "L" for left, the latter corresponding to the left eye and the former to the right, as the lenses are worn by the patients.

To employ the diagram with the single cell trial frame, it is only necessary to place the cylinder of the right eye over the right circle, with the edge of the trial lens of the left eye against the tangent of the left circle, and note the position of the usual short marginal guide line, which indicates the axis of the lens, in degrees on the circle. For the left eye the lens is placed over the left circle with the edge of the right lens against the tangent of the right circle, and the position of the left lens is similarly noted in degrees. This diagram is printed on the prescription blank for the glasses, in order to have it always at hand and ready for use. It has proved to be a rapid, correct and satisfactory method for noting the axis of the cylinder when writing the record of the case, and for indicating it with a pen or pencil mark on a diagram for the use of the optician, as it plats the axis of the cylinder or the prism precisely as it is to be worn by the patient.

The conventional angular notation generally adopted in the graduation of circles, as used by Donders, and still in common use by probably the majority of ophthalmologists and opticians, has been retained. As only the 180 degrees are necessary for establishing the axis, the numbers are duplicated in the lower half of the circle in order to facilitate the reading.

DISCUSSION.

Dr. Luedde: I recall some of the incidents connected with the making of plano-convex and plano-concave trial lenses with special rings to enable the use of two lenses in a single cell frame, referred to by Dr. Ewing in his discussion preceding the presentation of this prescription blank protractor. The first case made in this way by the American Optical Co. was made for me. Its manufacture was the result of a personal visit of

Dr. John Green, Sr., at the A. O. Co.'s plant at Southbridge, Mass. Dr. Green selected the material for the rings, which were made according to his own diagrams. He further ordered the grinding of the higher lenses in smaller intervals and extended the series, both in sphericals and cylindricals, beyond the limits of cases of this type made in former years by Wall & Ochs. (The latter firm gave up their manufacture because it was not appreciated by the trade and unprofitable.) The case was delivered to me in March, 1908, but was returned for the correction of certain defects. Another was secured immediately, however. More recently I secured a supplementary case containing the lenses most frequently used. This latter was furnished at a very moderate cost, so that now this very convenient form of trial lens, whose presence on the market to-day we owe to the efforts of Dr. John Green, can be secured easily. It is a matter of surprise to those who know these cases from personal experience that any one tries to get along with any other type. The ability to place a cylindrical and a spherical lens in a single cell in a way that reproduces, almost perfectly, the single final lens called for by the patient's error of refraction, is an advantage not to be overlooked in different cases. Most of the advantages of the chart submitted to be used in specifying the axis of cylinders are, I believe, contained in this one which I have been using for two years. In addition, I have provided for the designation of the meridian according to any of three systems in general use, by having two sets of numbers in separate rings at the circumference. First accustomed to the designation of meridians beginning with zero at the horizontal and continuing around to 180°, I have later adhered to the use of the vertical meridian for the standard of comparison as seems natural in the consideration of corneal astigmatism. My own preference is the method devised by Dr. Green, almost fifty years ago, by which the meridians to the right are are indicated by the + sign before the numeral and those to the left are distinguished by the — sign. There is in my experience no confusion with the + and — sign of the lenses in this method. However, on my chart the letters N and T, printed on either side at the top, permit the use of the terms nasal or temporal to designate on which side of the vertical the axis should be placed. To determine the axis of a trial lens in a frame, I have always found the large flat protractor, used by Dr. M. H. Post for many years, more accurate than any small disc, and equally convenient.

THE OPHTHALMIC SECTION OF THE ROYAL SOCIETY OF MEDICINE.

Discussion on the Physiology of the Intra-Ocular Pressure.*

Mr. Martin Flack said that a perusal of the printed report of the discussion, so far, showed that Professor Starling and Professor Hill held very divergent views as to the circulatory conditions obtained in the eyeball. Professor Starling believes it to be the result of a mechanical process of filtration, and hypothesises a difference of 30 mm. of mercury between the capillaries and the fluid outside. Professor Hill believes that the aqueous is a true secretion; he regards the ciliary processes as being wet protoplasmic films, and does not believe that filtration can exist within the eyeball. Professor Starling said that he found it difficult to follow Professor Hill's reasoning, and therefore he (the speaker) would like to elaborate that reasoning a little more. These principles were based on Professor Hill's well-known work on the circulation in the brain; that work had now been published many years, and it had never been proved to be wrong. It was well known that on exposing the brain, the brain substance bulged into the trephine hole; this bulging was circulatory in origin, for when the circulation ceased the bulging also ceased. Therefore the brain-pressure was a circulatory pressure, which was left over when the pressure due to the resistance in the arteries had been overcome—i.e., the pressure in the capillaries of the brain and pia mater. The pressure required to balance this brain-pressure, as measured by the compensation method, was the same, within the limits of experimental error, as the pressure of the cerebrospinal fluid and the pressure in the cerebral veins. The least excess over this pressure presses blood out of the capillaries. When Professor Hill talked of capillary-venous pressure he knew that it was slightly higher in the capillaries than in the venous sinuses, a slight gradient being necessary to maintain the flow; but the pressure transmitted through the wall of the capillary was equal to, not greater than, that in the veins. The venous outflow was not impeded by the pressure transmitted through the capillary wall. And since the pressure was equal to that in the brain substance, and in the cerebrospinal fluid, there could exist in the brain no force capable of producing filtration. So, too, in the eye. The eye, although not absolutely rigid, is sufficiently rigid for physiological purposes, and might more or less be regarded as a rigid box. Moreover, the skull of the child is not absolutely rigid, nor is that of a person who has been trephined, yet that weakening of the rigidity in no way interferes with the brain circulation. With regard to the eyeball itself, it had been shown by Koster that the raising of the pressure from 19 to 70 mm. of mercury increased the globe by seven-thousandths of its original volume. Thus the globe was not to any great extent distensible.

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*Adjourned from December 12, 1912.

Mr. Priestly Smith argued that the eye was capable of expansion because it was dimpled by applying pressure. But he would give a simpler explanation of that—namely, that pressure forces blood from the eye, and this could be verified by the use of the ophthalmoscope. Let one suppose that the pressure in the choroidal fringes was greater than that in the other cerebral capillaries, and that the cerebrospinal fluid was filtered through by this access of pressure, then this fluid, being at a higher pressure, would compress the veins and capillaries elsewhere in the surrounding parts of the brain where the pressure was lower. The only condition in the brain under which filtration could take place was when the skull was freely opened, and the cerebrospinal fluid allowed to escape. So with the eyeball: the condition necessary for filtration, in his view, was for the eyeball to be freely opened, and then one got, not aqueous, but a different fluid. According to Professor Hill's view, the same conditions would obtain in any encapsuled organ, and in the limbs and other parts of the body. The flow of tissue fluid was maintained not by any filtration process due to *vis à tergo,* but to the pulsatile expansion and shrinkage of organs, the action of the respiratory pump, the expressive action of muscles, extrinsic and intrinsic, the effects of gravity and of pressure. It was sometimes urged that as the secretory pressure of a salivary gland could go above the circulatory pressure, that was a true secretion and that the aqueous was not. Professor Hill and he had examined that recently, and had shown that in such a gland there was a special arrangement of basement membranes and connective tissue, which enabled the secretory pressure to rise above the arterial pressure, and the blood flow was not interfered with. But their researches showed that in the eye the blood flow was interfered with when the pressure of the aqueous was made greater than the arterial pressure. Professor Starling said—and that they could confirm from their own researches—that there might be a pressure of 5 mm. of H_2O in the tissue spaces—but he also stated there might be at the same time a pressure of 25 mm. of mercury in the capillaries. This, as the Professor said in criticism of Dr. Hill, is "pure assumption." Their experiments on tissue fluid were made by driving in a capillary needle under the skin, and measuring the pressure by the compensation method. The essential principle of the circulation was, that the heart pumped the blood into the capillaries, and that the movements of the body pumped it back again to the heart; that in the transference of the fluid by the secretory processes in the body, the controlling mechanism was the activity of the living cell, which was manifested in chemical reactions and physical phænomena, such as absorption and osmosis, and that this secretory process was the same as took place in the formation of and extrusion of the vacuoles by the protozoa, and in which filtration could play no part. The tissue cells draw in fluid from the capillaries and secrete it by the chemico-physical forces which pertain to living protoplasm.

Dr. Thomas Henderson said his views respecting the physiology of intra-ocular pressure were entirely dominated by Professor Leonard Hill's splendid work on the intracranial pressure, and therefore he maintained that the intra-ocular pressure was not a question of volume, but that, as in the case of the brain, it stood and varied with the intra-ocular venous pressure. He had not received the report of the last meeting, but he understood Professor Starling objected to that view, because it would mean that the venous pressure would be the same as the capillary pressure. Of course, such was not the case; the venous and the capillary pressures were distinct from each other and stood at different levels. The schema of the intra-ocular pressure, already referred to, showed that the intra-ocular pressure was the same as the venous pressure at the point of the venous exit. The points of the venous exit were, first and foremost for the subject under discussion, Schlemm's canal. The other points of venous exit were the veins crossing the supra-choroidal space to pierce the sclera, and finally the central retinal vein on the disk.

The arguments in favor of the venous exit level of the intra-ocular pressure could be stated very simply. Fluids were incompressible, transmitted their pressure equally in all directions, and always tended to lie at the lowest hydrostatic level. Now, in the elastic circulatory system of the eye the venous pressure at the point of venous exit was the lowest circulatory pressure, therefore the intra-ocular pressure was maintained at this level, because such was the lowest hydrostatic level attainable in the eye. To put the arguments in another way, the intra-ocular pressure must be either greater, less than, or equal to the venous pressure at the point of exit. If the intra-ocular pressure of the aqueous was less than the venous pressure in Schlemm's canal, the aqueous could not get away and would stagnate. On the other hand, if the intra-ocular pressure were greater than the venous pressure, the venous walls of Schlemm's canal would be compressed. Now, although Schlemm's canal could not be observed, another point of venous exit, the central retinal vein on the disk, could be studied. By using an electric self-illuminating ophthalmoscope to observe the disk by the direct method, and at the same time applying the tip of the finger to the upper lid in the region of the external canthus, he noted that this very light touch at once caused the retinal vein, at its proximal extremity, to become shut down. If instead of using digital pressure one used a pressure gauge, as made for him by Messrs. Weiss, he found that a pressure of about 2 mm. of mercury was sufficient, in the normal eye, to produce such an effect. Now this effect was noted on a vessel whose walls were considerably thicker than the single layer of endothelial cells composing Schlemm's canal, but, in position, both vessels were points of venous exit. Therefore, if such applied pressure sufficed to cause diminution in the lumen at the point of exit of the retinal vein, it would produce a similar effect at all other points of venous exit, including Schlemm's canal. This clinical observation showed that the intra-ocular pressure cannot be a question of volume, but that the intra-ocular pressure and the venous pressure at the point of exit always balanced each other.

Professor Starling was an ardent advocate of the filtration theory of aqueous formation, and, at first sight, nothing appeared simpler. There were vessels on one side of a filtering membrane and filtrate on the other. But the theory took no note of the fact that the vessels were embedded in a loose tissue stroma, which stroma was in direct and open communication with the angle of the anterior chamber. The ciliary epithelium could not, therefore, act as a mere passive filtering membrane, because the pressure on both sides of it was the same, and if fluid did filter from the vessels, that would make its way direct into the angle of the anterior chamber.

Mr. Herbert Parsons said that, for various reasons, he proposed to deal only with a few points in this discussion. One reason was that he felt quite unqualified to deal with the physical side of the problem in the face of Professors Hill's and Flack's and Mr. Thompson Henderson's views. But he did not understand the extraordinary antipathy which Professor Hill and his colleagues evinced towards filtration; they seemed to him, whenever possible, to introduce some difficult method of physiochemical influence to explain processes which were subject to simpler explanation. He preferred to leave those questions in the hands of Professor Starling, who was present to reply on the discussion.

He thought Dr. Hill had laid unnecessary stress on the needle, and not so much on the beauty of his own needle as on the inefficiency of other people's. Dr. Hill's needle was admittedly a very beautiful instrument, but he did not think that gentleman had succeeded in attaining his aim. He understood him to say the sclera was a rigid box containing fluid, which was incompressible, and when Dr. Hill said "rigid" he probably meant rigid, while apparently some other people did not. That box was filled with fluid, and into it he forced a solid body of finite magnitude without losing aqueous, which seemed a difficult problem. The explanation would dobutless be that blood was forced out of the eye. If that were so, the intra-ocular pressure, being equal to the venous capillary pressure, the venous walls collapsed, and the pressure inside the globe must go up, and something must happen; either the walls must be ruptured, or the fluid must escape somewhere. The only point in which Professor Hill's work differed from that of previous observers was in the very high intra-ocular pressure he got in some experiments; and that was probably due to displacement of fluid by the needle. In avoiding one difficulty with extreme care, Dr. Hill had introduced another error in not allowing for the displacement of fluid by his needle. It would be noticed that the highest pressures, as set forth in the Royal Society papers, were produced with ether anæsthesia, and that might have something to do with it Another point was, that the walls of the globe *not* being rigid, unless the animal was curarized the extrinsic muscles might produce a relatively enormous effect upon the intra-ocular pressure. He believed he (the speaker) was the first to show that the increased pressure which was easily produced on stimulating the peripheral end of the cervical sympathetic was due to contraction of the unstriped muscle in the orbit. But how the fact that the extrinsic muscle pressure raised the pressure in the globe was to be explained on the theory that the walls of the globe were rigid he failed to understand. Scorn had been cast on Koster's experiments, but for a globe to increase in volume 45 c.mm. with a rise of pressure from 20 to 70 mm. of mercury was quite appreciable, and how one could contend that the volume was constant under those circumstances he could not see. He thought secretion and absorption was fundamentally *a process* which was carried on by the capillaries. From the evolutionary point of view probably the earliest stage was that capillaries performed both functions, and physical forces were utilized, as Nature usually did use them, and in some such way as the following: The filtration process in the capillaries was brought about by a vasomotor mechanism; if the arteries were dilated there was a greater intra-capillary pressure, and a process of filtration or secretion went on. If the arterioles were constricted, the intra-capillary pressure was diminished, and absorption was permitted. He did not mean to say that the utilization of such physical processes in any way eliminated the activity of the living cells which formed the filtering membrane; they had their functions to perform. That was seen in the ease with which various immune bodies passed through the capillary walls whilst others were kept back by them. These substances followed no known physical laws. Agglutinins would soon go through into the normal aqueous, but if the animal were immunized to a foreign blood the hæmolytic elements would not go through, except under diminished intra-ocular pressure, when the aqueous had a much larger protein content. One could, then, understand that at a higher state of development and with the differentiation of different organisms the processes might be separated, one set of capillaries performing secretion and another absorption. The work of Leber and others tended to show that the principal function of the ciliary body was that of secretion, and that of the iris was absorption. On the other hand, the supply of nutrition to the choroid, for example, was carried out by the same capillaries as took the products away. If the experimental facts were not inconsistent with a purely physical explanation, one had no right to call in other factors until one knew that the known factors failed in some essential particular. In the contribution by Professor Hill and Mr. Flack the only experimental evidence brought forward was practically a repetition of what had been available from the work of many observers from 1850 onwards. They were at liberty to put forward any theory they wished, but it was necessary to bring forward some definite experimental evidence which was not explicable on current views, or *per contra,* they must submit evidence which upset that already adduced.

Mr. Rayner D. Batten gave a demonstration, by means of toy balloons, of the relationship of tension to pressure. He said that the ocular tension, as felt by the finger, was a mixed sensation, including as it did, several factors—intra-ocular pressure, and resistance, the latter being divisible into two, in so far as it depended on freedom of exit of fluid from the globe, and on the elasticity of structures outside the globe, in connection with the fluid in the globe. A third factor was the tension of the structure itself.

The balloons demonstrate some of these points: The pressure in the various sections is the same, but the tension is markedly different. They also show that the tension can vary, depending on the condition of the wall, in different parts of the globe, although the pressure is the same. (1) They demonstrate that the feeling of resistance is largely dependent on the freedom of exit of fluid. (2) On the elasticity of structures connected with the fluid in the globe.

Mr. Greeves pointed out that an increase in the volume of the eyeball, with rise of intra-ocular pressure, could be easily shown. Koster, in his experiments, took measurements of plastic casts of eyes which had been subjected to various degrees of pressure, and found definite increase in volume with rise of intra-ocular pressure. Schulten obtained similar results by another method. He (the speaker) did some experiments with fresh pig's eyes and got similar results. He put the eyes in a bottle filled with saline and fitted with a rubber stopper, through which was passed a tube measured off in cubic millimetres, and a hypodermic needle connected with the eye inside the bottle, and with a pressure bottle outside. Changes in the volume of the eye were thus read of in cubic millimetres. With a pig's eye of average size, taking the normal intra-ocular pressure as 25 mm. of mercury, the increase in size was 1 c.mm. per millimetre of mercury rise of pressure. For the first 10 mm. rise of pressure above the normal the rate of increase remained the same, but thereafter it gradually became less. These results proved that the eyeball was not a rigid case, and that the increase in volume corresponding with even a slight increase in pressure was quite a measurable one.

Professors Hill and Starling replied at full length to the verious points raised during the discussion, and were heartily thanked by the Section.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,

ST. LOUIS, MO.

PREVENTION OF PURULENT OPHTHALMIA IN THE NEWBORN.

P. Zweifel (*Zentralblatt für Gynäkologie,* July 6, 1912) emphasizes the value of prophylaxis concerning the infection of the eyes following childbirth. To determine the best solution to be used by the midwives, one that while effective would produce the least damage if used carelessly, he experimented on the web of frogs' feet with solutions of silver nitrate, silver acetate, argentin, protargol and silver acetate, followed by salt solution and "sophol." Of these silver acetate is recommended, since not more than a one per cent. solution can be made at ordinary temperatures, and it does not become concentrated and can be preserved indefinitely. Silver nitrate decomposes quickly, and the author found by experimentation that it increases in strength by evaporation from a one per cent. to an eight per cent. concentration in the course of five months.

THE TEACHING OF OPHTHALMOLOGY IN AMERICA.

Wendell Reber (*Penn. Med. Jour.,* January, 1913) summarizes his views as follows: It is our belief (1) that thoroughgoing ophthalmic instruction is to-day best obtained in a post-graduate institution with its attached clinic or clinics, the exception being in the case of those men who may attach themselves for a period of years to a well-organized ophthalmic clinic in their own cities; (2) that legislation in behalf of post-graduate teaching does not in the light of present conditions seem feasible; (3) that regulation is imminent and rational and can be more easily and readily achieved by co-operation among post-graduate institutions than by any other means now at hand; (4) that the six weeks' course should be abolished; (5) that a three months' minimum and a working year maximum course would probably furnish the best working basis for agreement among our post-graduate institutions; (6) that no applicant for post-graduate teaching, who has not completed three years in general practice or its equivalent in general hospital work, should be admitted to any of the well-organized specialty courses; (7) that certified attendance upon a recognized ophthalmic clinic for one or more years (after three years in general hospital work) should entitle such a clinical assistant to examination for whatever degree in ophthalmology might be agreed upon among the American post graduate institutions; (8) that this plan would provide as many well-trained workers in ophthalmic science as the nation would have need of for years to come.

THE SOCIOLOGIC ASPECT OF ERRORS OF REFRACTION.

William Zentmayer (*Penn. Med. Jour.*, January, 1913) offers the following suggestions on this subject:

1. As affections of the eye that may lead to incurable blindness and consequently to an economic loss and a possible tax upon the community may have their origin in, or be aggravated by, errors of refraction, such errors when producing symptoms should at once be corrected.

2. That it would aid in the efficiency of labor and prove an economic saving for corporations or others with large office forces to require of applicants for employment an examination of the eyes by a competent ophthalmologist and, where errors of refraction are present of a degree which in his judgment require correction, to insist upon their correction.

3. That the examination of the eyes of school children should be compulsory by state law (such a law is upon the statute books of but very few states). That such examination should be made in a thorough manner by a competent ophthalmologist, and not as is done in most cities by physicians, nurses and teachers who in a perfunctory manner endeavor to ascertain only the vision and this under conditions which give entirely untrustworthy results.

4. That as it seems possible that certain types of epilepsy may have a reflex ocular origin, this question be made the subject of further careful institutional study.

5. In consequence of the adoption in many of the states, and the probably final adoption in all of the states, of workingmen's compensation laws, it is of the utmost importance to employers to have the eyes of their employees and applicants for positions examined by competent ophthalmologists and, where subnormal visual acuity exists as the result of errors of refraction, to have it brought to normal by the correction of the error.

6. That a campaign of education of the public to the danger of

entrusting the examination of the eyes and the treatment of defective vision to those whose only qualification is their assurance, and their only aim the successful accomplishment of a business transaction be carried on. That this be done through the columns of such papers as hold the public good above commercialism.

BOOK REVIEWS.

SCLERO-CORNEAL TREPHINING IN THE OPERATIVE TREATMENT OF GLAUCOMA. By R. H. Elliott, M.D., London, 1913: Geo. Pulman & Sons. Price 7s. 6d.

This monograph, by one whose name in the history of our fight against the dread disease glaucoma is indelibly written on the page which will record the operations of trephining, must be received with the greatest interest by ophthalmologists. And it is indeed a pleasure to study it, since it is a thoroughly scientific work, detailing the previous work by others which led Elliot up to his operation, followed by the recital of his own method, in the modest and yet convincing manner of the real seeker after truth.

EYE-STRAIN IN EVERYDAY PRACTICE. By Sydney Stephenson, Editor of the Ophthalmoscope. London, 1913: The Ophthalmoscope Press. Price 3s. 6d.

This monograph contains papers and lectures previously published by the author.. As he states in the preface, Stephenson, like others, with enlarged experience has become more and more convinced of the influence of eyestrain in producing general reflex neuroses. Yet that he is not visionary in his views on the subject, but sanely conservative and convinced by facts only, can be read out of every page.

OPHTHALMIC SEMIOLOGY AND DIAGNOSIS. By Charles H. Beard, M.D. With 13 colored plates and 71 Figures in the text. Philadelphia, 1913: P. Blakiston's Son & Co. Price $4.

The book by Beard forms part of the international System of Ophthalmic Practice edited by W. L. Pyle, M.D. It deals preeminently with symptoms and diagnosis. It is in every respect an excellent book. It possesses a special charm by reason of the excellent and artistic illustrations from the author's own well-trained hand. It is a pity that the few Greek words explaining technical terms in use are so incorrectly spelled. Yet, that is a minor point and does no harm to the subject matter, which should certainly appeal to a large number of readers and students.

Die Entstehung der Sphaerischen Refractionen des Menschlichen Auges. (The origin of the spherical refractions of the human eye.) By Adolf Steiger, M.D. With 15 illustrations in the text. Berlin, 1913: S. Karger. Price 18 marks.

Not convinced of the correctness of all preceding theories, especially on the origin of myopia, the author has given years to the special study of this subject and has recorded his criticisms and opinions in this voluminous work. One of the chief contentions is that myopia is not a disease brought on by the demands of culture, and that school myopia as defined by Cohn and his followers as such does not exist, but is due to inherited defects, especially astigmatism. The reading of this book, in which, it seems everything ever written on the subject is gathered together and critically sifted, is a most interesting task. The author comes to the conclusion that the myopia question cannot possibly be solved in the old ways, and proposes new ones, paying especial attention to the developmental history of races and individuals, which the reader should study for himself. Alt.

A PRIZE IN OPHTHALMOLOGY OF 5,000 FRANCS.

Through the liberality of a generous philanthrope who desires to remain unknown, a prize of 5,000 francs will be awarded in 1914 to the best work on the ætiology, the prophylaxis or on the treatment of those forms of iritis, iridocyclitis or cyclitis which are not caused by syphilis.

No memoirs will be admitted which have not been previously presented and read before one of the ophthalmic societies in France or elsewhere. A jury composed of three members elected from among the ophthalmologists of the principal Parisian ophthalmic institutions will make the award.

Memoirs typewritten, or printed in French, English or German, must be received on or before August 15th, 1914, in the office of the Annales d'Oculistique, 26 Boulevard Raspail, Paris, France.

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MEDICAL SOCIETIES

FORTY-NINTH MEETING OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY.

Held at Washington, D. C., May 6th and 7th, 1913.
Reported by Mrs. M. C. Repp.

The President, Dr. Myles Standish, in the Chair.

Degeneration of the Corneæ of a Man and His Adult Son.—Dr. Burton Chance, Philadelphia.

These cases are examples of nodular degeneration of the cornea as found in two or more generations or in several members of a family. The men were aged 54 and 26 respectively, and each had been practically blind since infancy. No other members of their family for five generations were known to have had serious or unusual affections of their sight.

Each of all four corneæ was occupied by a large but faint disk which covered the central two-thirds of the corneal area, while the outer third, including the limbus, was perfectly transparent and unaffected. The disks consisted of fine, dotted groups of a yellowish-gray flocculent material or coagula, arranged in more or less radiating lines situated beneath Bowman's membrane and in the anterior layers of the stroma, as though resting between the membrane and the stroma. Here and there were glistening points like crystals. At the apex of the summit there were two larger, bubble-like bodies which projected beyond the general surface of the cornea. The epithelium was intact and glistened. The diskoid areas terminated somewhat unevenly in an indefinite radiating network. The center of each disk was condensed, outside of that was a more or less transparent zone while beyond was another denser portion which ended in more or less diamond-shaped reticulations. The corneal membrane beyond the areas was quite clear and healthy, showing neither infiltrate nor vessels. The crypts of the iris were deep, the reactions prompt. No view of the funduses could be obtained, but the vitreous bodies were presumably clear and the retinæ believed to be healthy.

The son's corneæ presented the same characteristics as the father's except that the opacities were not so dense, and were more reticulate. The surfaces were even, smooth and polished and distinctly sensitive.

The opacities were circumscribed and bilateral of approximately equal size in each eye, and each person's like the other's, except that the son's were less dense, or rather the lines were not so numerous. At first glance they looked like the residue of an interstitial keratitis. At the center of the patches the masses were so close together as to be without arrangement and it was only at the periphery that the retriculation was apparent. There were no signs of inflammation, no pannus nor obliterated vessels. The irides were healthy. There was no criss-cross latticing of fine threads, as in Haab's and Freund's cases; nor pigment dots, as in Doyne and Stephenson's, and the surfaces were smooth as in Fehr's.

Each man was subjected to the Wassermann and to tuberculin tests, with negative results. A thorough study of their chemic metabolism showed the same comparative percentages as found in healthy individuals; and so also did the blood-contents with the differential countings.

DISCUSSION.

Dr. William Zentmayer, Philadelphia: A point I think should be made is the differential diagnosis between different kinds of interstitial keratitis. In naked eye appearance they resemble one another very closely, but with the corneal telescope the changes are quite different. The absence of vascularity which prevents blood channels in the cornea and the total and prolonged involvement of the iris are points against interstitial keratitis. I think in the man's case particularly the condition looked like the sequelæ of an interstitial keratitis, perhaps because the process was so much older than in the young man. I think with care they could be diagnosed from interstitial keratitis. As far as the ætiology is concerned it is to be looked upon as a hyaline degeneration, not of tuberculous origin. The process resembles somewhat that of nodular keratitis.

Dr. John E. Weeks, New York: A few months ago I presented cases similar to these at the meeting of the Section on Ophthalmology of the New York Academy of Medicine. In the father the degeneration was quite well advanced. That is, the vision was reduced as far as I can recollect to about 17/200; while in the son, who is a man of 21, the vision was 20/70. In this family there were 3 sons and 1 daughter, and 1 other son had defective vision. This condition is the so-called family degeneration and it is in all probability a condition due to what has been handed down through generations. These cases begin early in life and tend to increase somewhat as the individual grows in years.

Dr. G. E. De Schweinitz, Philadelphia: I would like to say a word as to a matter of therapeutic interest, because Dr. Chance was kind enough to permit me to examine his interesting patients. In a case of similar character—familial degeneration of the cornea—in a man familiar to my colleagues in Philadelphia, I tried for a long period injections of tuberculin. It was once believed by Wehrli to be a form of chronic tubercular disease of the anterior layers of the cornea. There were absolutely negative results from the tuberculin. I also tried in this same patient, who was willing to submit to a great many things, a line of subconjunctival injections, in the hope of influencing some of the deposits, but with negative results. I finally tried both instrumentally and by the fingers a long series of massage experiments, with dionin, etc., and plain massage. The patient was mesmerized into believing that he was somewhat better. He was not. I cannot truthfully say that there was one particle of improvement in the visual power.

Dr. Samuel Theobald, Baltimore: I have under observation now and have had for 12 or 18 months a case similar to the one described. The vision of one eye is more affected than the other. I have tried every conceivable form of treatment, constitutional remedies and local remedies, eserin and constitutionally arsenic and everything that could be thought of. The condition improves at times. Once or twice I thought it might disappear and then it grew worse. The other day the patient came to my office and this was one of the periods when things looked less promising. The cornea is decidely uneven and opaque. I was in hope that I might hear something that would be of value here. In my case the tension is not what you would call plus, but it has been suggested that benefit might result from iridectomy not only for visual purposes but to improve the condition of the eye by some lessening of tension. I hoped that some suggestions of that kind might be made to throw light on my case.

An Extreme Case of Conical Cornea with Cataract.—Dr. David Harrower, Worcester, Mass.

This patient was a man aged 66 who had been affected by conical cornea for about 25 years. It was one of the most extreme cases I have ever seen and was complicated by mature cataract. The sight was so bad that he had to be led by an attendant. Operation for cataract by extraction of the lens was performed. A good operative recovery was secured and the patient is now able to go about the street alone.

Keratoconus, with Reports of Cases.—Dr. John E. Weeks, New York, N. Y.

There are four principal objective methods of diagnosing keratoconus which is in the beginning rather difficult to recognize:

(a) Observation with the ophthalmoscope which will disclose a myopia at or near the center of the cornea and a distortion of the retinal image. Observed with plane mirror the apex of the cone, when the patient looks at the source of reflected light, gives a bright reflex surrounded by changing concentric shadows on slight movement.

(b) The retinoscope, which gives the effect of irregular astigmatism, the reflex from the cornea being small at the apex of the cone and elongated into an irregular wedge-shape at the sides of the cone.

(c) The keratoscopic examination my means of Placido's disc, the image of the disc being elongated and broadened toward the periphery of the cornea.

(d) The ophthalmometer. This is probably the most sensitive test.

Various methods of both palliative and operative treatment are advised by different authorities upon this subject. In the study of keratoconus it occurred to the writer that in order to bring about a suitable permanent reduction of the cone by operative procedure it was necessary to reduce the tension of the eye as much as possible and to maintain this hypotension for a long period of time until healing was complete. To this end it was thought best to perform iridectomy, placing the coloboma where it would ultimately be of greatest aid to vision because of its well-known tendency to reduce intraocular tension, and at the end of one or two weeks to apply the chosen procedure to the apex of the cornea, following this by the use of pilocarpine and a compress bandage. In the five operated cases reported this procedure was followed. About 10 days after the iridectomy the apex of the cone was cauterized in an oval area with its long axis horizontal with a platinum point heated to a red heat in the flame of a spirit lamp. The bandage was applied continuously for three weeks and at night for two months. Analysis of the fifteen cases which I report shows that even when the vision had fallen to 8/200, or less, it may be very much improved by the procedure described.

DISCUSSION OF PAPERS BY DR. HARROWER AND DR. WEEKS.

Dr. Robert Sattler, Cincinnati: I share with Dr. Weeks, as probably do many, the opinion that the keratoconus is inexorable, that the causes also could not be determined. I have also proved to myself that .to prevent keratoconus is impossible. Also, that we can do little towards checking the advance of the symptoms. As far as the operative treatment is concerned we have had some favorable results, but a larger number are not favorable.

Dr. Edward Jackson, Denver: I have within the last week had a case of extreme conical cornea following a perforation of the cornea. The patient was a girl not more than 5 years old. In one eye there was a small perforation near the outer margin of the cornea, and the cornea subsequently became quite conical. In that case the lens had been removed by discission and it leaves a myopia of 17 diopters. The vision is improved somewhat by the concave lens, but it is scarcely adequate for reading large type.

Dr. C. H. Beard, Chicago: About 15 years ago I reported a case which gave me some new ideas in regard to the treatment of keratoconus that I have since put into practice with considerable success. This case, a woman, 35 years old, came to me on account of high myopia, 22 diopters in one eye, 24 in the other. With the best correction she got vision of only about 20/100. With a view of relieving her condition I advised removal of the crystalline lenses by discission. I performed several discissions on either eye, meantime keeping the eyes snugly bandaged so that the process took a long time. Much to my surprise when the case was discharged the cones, which were extreme, had almost disappeared. Since that I have used very conservative measures in the management of these cases of keratoconus. With regard to the dystrophic nature of keratoconus, almost all my cases have been in young women of perfectly robust health.

Dr. William H. Wilmer, Washington, D. C.: It has always seemed to me that the use of pilocarpin in keratoconus is illogical, but pilocarpin is used everywhere extensively and I see no logical reason for its use except to give the patient temporary vision. It increases the keratoconus by the effect of pulling in the base of the cone. If it is a mild case a great deal can be done by three things which are perfectly logical and which do help the condition. The first is making the patient give up eye work. There are many fields open, the orchardist, expert dairyman, the farmer. Make the patient give up his books and go to the farm. Second, correct the refractive change by glasses having the cylinders plus or double plus. Building up the general condition does help to stay cases in the beginning. My experience has not been that keratoconus occurs in robust people. The last six cases I have seen were in anæmic individuals.

Dr. T. Y. Sutphen, Newark, N. J.: My experience shows that improvement in the general condition seems to stay the disease, while in strumous cases, and in cases in which a catarrhal condition exists and where there is a long continued conjunctival inflammation, the keratoconus has a tendency to grow worse.

Dr. William Campbell Posey, Philadelphia: In operating on conical cornea I aim at producing a large, dense and triangular scar in the base of the cone, making the cauterization densest at the periphery of the cornea and lightest at the apex of the cone. I think it is necessary that one should have a large and dense scar. If the pupillary area of the cornea is not covered by the scar it may happen that it will not be necessary to cut out a piece of the iris. Tatooing of the cornea is often of value not only on account of its cosmetic effect, but to cut out aberrant rays of light.

Dr. Allen Greenwood, Boston: I advocate a little earlier operation than seems to be generally done. A patient with vision of a little less than 22/100 is almost invariably bettered by a proper cauterization. I have operated on 4 cases and I am very positive that all four of these patients would testify to the great benefit of the operation. One young boy whom I operated on this spring with a vision of 24/100 with a glass, much less without a glass, now has a vision of 20/70 with a very dense white scar, which he can see around and can read newspaper type. He certainly is very grateful. I think it is better to do the cauterization without waiting too long.

Dr. William Zentmayer, Philadelphia: If one will look back over the literature of 20 years ago, he will find an admirable paper by Dr. James Wallace on "Refraction of Ulcers of the Cornea." Some of the results were brilliant and accomplished by exceedingly high cylinders which were determined after a prolonged course of miotics. I have pursued his method since Wallace brought it forward and I can speak highly of it. Of course it does not take the place of operative interference where there has been breaking down and scarring at the apex.

Dr. John E. Weeks, New York: I am very glad the subject has awakened so much interest. Two of my patients were rather anæmic and in poor health. The others were apparently quite robust. As to the influence of the use of the eyes on the advance of the keratoconus, it is important that the patients should be restricted in the use of the eyes for close work. Outdoor life will help very much. In regard to changes in the eyes, other than these which take place in the cornea, in those I have studied the eyes have remained normal so far as other tissues are concerned. In regard to operative procedure, if the cauterization is done so as to leave the apex clear, in many cases the visual result will not be very good because the corneal tissue at the apex is frequently hazy. The haziness tends to increase below and an iridectomy, if it is to be of visual value, should be made in the majority of cases, above on the temporal side. The cauterization done by Posey is good, provided the cauterization of the cone is extensive enough. The principle involved in making the iridectomy is one of reduction of tension and that is also the principle that I endeavor to carry out in the use of miotics.

Interstitial Keratitis of Luetic Origin.—Dr. George S. Derby, Boston, and Dr. Clifford B. Walker, Boston (by invitation).

Interstitial keratitis probably occurs in 1 out of every 200 cases of eye disease. The mode of production is still shrouded in mystery. It is considered by some to be due to irritation by spirochætæ in the cornea, while others consider it due to the toxins of the disease. This is one of the most discouraging diseases to treat. The lesions are extremely unyielding to antisyphilitic treatment, including salvarsan. During the past winter the authors have treated 6 cases of interstitial keratitis with serum from patients who had been injected with salvarsan, but in none could the results be considered encouraging. Energetic antisyphilitic treatment should be carried out in these cases.

DISCUSSION.

Dr. Emil Gruening, New York: Dr. Derby remarks that keratitis parenchymatosa is one of the most unpleasant diseases to treat and that the results are not satisfactory. In my experience, which dates back prior to salvarsan and before we did all the social service that we do now in investigating the whole family, I have never seen a case of keratitis parenchymatosa lost. Every case recovers in my experience if properly treated generally and locally. If there are toxines in the cornea these toxines make themselves felt in the iris and we often have iritis. This should be treated by instillation of atropia, strong solutions, under the observation of a physician, should be used so that the pupil remains dilated. It will not do to send the patient home with a few drops and say, "Put this in the eye and come back in a week or ten days." Keep the case in the hospital. All the hospital cases get well. I would say that keratitis parenchymatosa is one of the most hopeful diseases we have.

Dr. H. D. Bruns, New Orleans, La.: It seems to me that we ought to take part in these debates when they touch on subjects in which we have an especially large experience. As the negroes with us are pretty nearly all syphilitic and their offspring have interstitial keratitis in a wholesale way, I see it incessantly and everlastingly, I agree fully with what Dr. Gruening has said. It is one of the most benign of diseases. I never saw a case that did not get well. I have seen them get well in a few weeks, while others will drag along for months or even two years. It is only by taking a vast number of cases, getting some idea of average duration, then comparing large series of cases treated in various ways that we can arrive at certain conclusions as to whether our treatment is doing good or not. I believe we should employ, and with advantage, a vigorous anti-syphilitic treatment, the best being inunctions if possible with Turkish baths repeated and inunctions in large quantity, using the mercury to the point of toleration. Locally I know of nothing but to keep the pupil dilated.

Dr. W. B. Marple, New York: We all know that interstitial keratitis gets well, but it is a question as to whether it gets well any quicker by the use of salvarsan or the old methods of treatment. Up to about a year ago I had the impression that salvarsan was not of any special therapeutic advantage. This year in the cases of interstitial keratitis which came under my observation I gave salvarsan, and in two weeks a second and possibly in two weeks more a third injection. While I have not become very enthusiastic about it, I am sure the results are very much better when the dose is repeated.

Dr. Frank J. Parker, New York: I had an opportunity to use salvarsan in a limited number of cases of interstitial keratitis and in all of the cases the drug was given intravenously and routinely repeated at the end of a week. Whether subsequent doses were given or not depended upon the Wassermann test. In 1 case 5 doses were given. In the cases where the Wassermann was not negative after the second dose there was no immediate relief of the inflammatory symptoms. In the cases where the inflammatory symptoms cleared up immediately, almost in every case, the Wassermann was negative.

Dr. R. L. Randolph, Baltimore: I have in mind 4 cases of interstitial keratitis. In all 4 cases the Wassermann reaction was positive. There seemed to be then no doubt as to the presence of lues. In 2 of the cases there was a typical picture of the hereditary form of the disease; in the other two cases, of the acquired form of lues. In the cases of hereditary lues the salvarsan had not the slightest effect so far as I could see. I take the same view as Dr. Gruening as to prognosis. I have never been inclined to regard the prognosis serious as regards sight. I can recall none that did not recover sight.

Dr. George E. De Schweinitz, Philadelphia: As for salvarsan, I have experimented by taking into my wards cases of interstitial keratitis which occurred in young men and in children. All the patients had previously been treated by the ordinary methods. I have never in my therapeutic experience seen the clearing which took place in the corneæ of those patients equaled by any other procedure. The salvarsan was given in repeated doses at intervals of 2 or 3 weeks in full doses. In the intervals between the injections of salvarsan the treatment by mercury and iodide of potassium with the salvarsan, as advocated by Dr. Gruening, was carried out.

Dr. Charles W. Kollock, Charleston, S. C.: My experience is that of Dr. Bruns as to syphilis in the negro and the prevalence of interstitial keratitis. Also, most cases of this disease recover. Quite a number recover without any treatment. There is no doubt about that. I mean without any medicinal treatment, if they have the right hygienic surroundings and the right food. I have treated them principally by inunction and not very much by iodide of potassium.

Dr. John E. Weeks, New York: We know, those of us, at least, who have had experience, that interstitial keratitis is affected very little by salvarsan. It is affected somewhat, however, and it is affected more markedly in the cases that are most acute. Apparently these cases that are most acute have a greater content of spirochætæ. In cases of acquired syphilis the effect of salvarsan is quite remarkable. It has appeared to me that the content in spirochætæ in acquired syphilis is greater than in inherited. The use of neosalvarsan is falling into disrepute in my experience.

Dr. S. Lewis Ziegler, Philadelphia: There is no doubt that these cases of interstitial keratitis improve more rapidly under the use of salvarsan than by the use of other methods. But, on the other hand, it is not necessary to stop the other methods. In the cases that I have observed the salvarsan produced a rapid improvement and a rapid reduction of the Wassermann reaction. The intravenous injections produced better results than the intramuscular.

Ophthalmia Artefacta (?).—Dr. H. D. Bruns, New Orleans, La.

History of a white girl, aged 17 years; no particular evidences of ill health, but of scrofulous type. First came to clinic for catarrhal blepharoconjunctivitis May 13, 1908. Superficial ulcer appeared on skin of both lids of left eye on June 6. Healing was slow, and on August 24 a shallow, angry ulcer of the right lower cul-de-sac invaded the bulbar conjunctiva. On September 9 a black spot in its depths was supposed to be the exposed choroid. On September 18 the ulcerated area became suddenly much greater, extending from the corneal limbus down into the lower cul-de-sac and up the palpebral conjunctiva to the free edge of the lid, with an average width of quite one-quarter of an inch. The ulcerated surface looked as though stained with ink, the central and deepest portion of a still more intense black. The discoloration was clearly perceived to be due to tissue necrosis. These attacks continued with varying frequency. In July 20, 1910, similar lesions appeared on the skin of the body. The patient was now admitted to the ward of Dr. H. E. Menage, one of our consulting dermatologists, who considered the skin lesions self-inflicted (*New Orleans Med. and Surg. Jour.*, Vol. LXIII, No. 6). Nothing noteworthy could be found by the neurologist, the laryngologist or the internist. Examination of smears, cultures and bits of tissue were negative. The injection of diphtheria antitoxin, and the ocular tuberculin test, applied by Calmette's own hand, were without result. All forms of treatment were unavailing. Nubeculæ, leukomata, and symblephara followed, and vision was greatly impaired. Twice, successful operations for symblepharon were performed, but the repairs were swept away by gangrenous ulcerations. Although it seems incredible that a person would slowly destroy both eyes, reducing herself almost to blindness, while month by month the gradually growing calamity of her own act might be perceived and appreciated; that she should submit herself to four trying, if not painful operations and the tedium of recovery, and then maliciously lay waste her own comfort; yet, in spite of this incredibility, I see nowhere to turn from the conclusion of my colleague, Dr. Menage—that, as the skin lesions were self-inflicted, dermatitis factia, so by analogy the eye condition must be called ophthalmia artefacta; and this is my excuse for presenting the case, and so putting it on record.

DISCUSSION.

Dr. F. H. Verhoeff, Boston: Several years ago I saw a case that was so similar to Dr. Bruns' that I am wondering whether it was not a sister or the same case that finally got into his hands. This was a young lady, also scrofulous. When I first saw her she had a very slight inflammatory condition of the conjunctiva of which I made light. I think that is the secret of her trouble. Two or three days later I found her in the hospital and she was suspected of having secondary syphilitic lesions all over the skin. In addition to that she had a condition of the eye that I have never seen before, a gangrenous appearance extending over the corneal limbus, to the equator on one side. The case was suggestive of hysteria. The skin lesions looked like keloid scars. The patient said they had a habit of bleeding spontaneously in a miraculous manner. I had her put in a room and a nurse to watch her closely and one day the nurse found her finger-nails stained with blood and it was then easy to trace the eye condition. She had taken her finger and had dug into the bulbar conjunctiva, into the sclera and laid bare the sclera back to the equator. Then the neurologists were called in and they confirmed hysteria. I advised spanking as treatment. The neurologists did not agree. I do not know what the final outcome of the case was.

Dr. H. D. Bruns, New Orleans: I do not think this girl could have been any relation to Dr. Verhoeff's girl; she never had been out of the state; she did not belong to the class that could travel. She had not the means to get out of New Orleans. I treated her almost for 2 years and the last condition of this patient was worse than the first.

The Prophylaxis of Ocular Birth Infections.—Dr. Robert Sattler, Cincinnati.

Bacteriology now directs a more certain diagnosis and, in accordance therewith, assigns ocular birth infections to non-specific and to specific or gonococcal organisms. The term ophthalmia neonatorum should be discarded. Non-specific organisms comprise a larger contingent, and specific or gonococcal, a smaller but more variable one, or 50 per cent. or less, of the total of all birth infections. This entire subject had been invested with a silly and false sentimentalism on the part of many social science workers and members of the medical profession. We have a fairly reliable prophylaxis for non-specific organisms, but a next to impossible one for specific or gonococci. Non-specific infections will and can never be completely wiped out, as the causes which produce them will repeat themselves, but their gravity and number can and will be more certainly reduced in the future. Specific or gonorrhœal infections will continue undisturbed their destructive work and defy the best prophylactic measures at present at our command, and claim their quota of infantile eyes. Infantile ophthalmo-gonorrhœa is as heretofore the same public menace and a preventable outrage upon helpless infancy. Now, as formerly, it reaches and maintains a numerical level which fluctuates but little.

DISCUSSION.

Dr. Lucien Howe, Buffalo, N. Y.: It behooves us as members of the American Ophthalmological Society to make ourselves prominent in advocating prophylactic measures in our different states. To the effect that children born in public institutions shall have some form of prophylactic treatment used. These children are the wards of the state and the state has a perfect right to say what shall be done.

Dr. George F. Fiske, Chicago: I would say a word in regard to the use of nitrate of silver, which has been advocated for a number of years. I have seen myself 4 cases where the instillation of 2 per cent. nitrate of silver has caused ulcers on the cornea in 24 hours. It might cause trouble and it should be watched carefully.

An Unusual Case of Staphylococcus Conjunctivitis.—Dr. William H. Wilder, Chicago.

By invitation, Dr. David J. Davis, of Chicago, gave the bacteriological findings in the case.

A frail colored woman, aged 30, had suffered for 5 years with conjunctivitis which showed alternate exacerbation and improvement but was resistant to various forms of treatment. A peculiar feature of the case was the presence of a greenish exudate which formed rapidly upon a granulomatous mass in the inferior fornices. The patient was tuberculous, one kidney having been removed for this condition, but there was no evidence of tuberculosis in the conjunctiva. The eye condition was found to be due to staphylococcus infection, pure cultures of this germ having been found. An autogenous vaccine was prepared in September, 1911, and a course of vaccination with this carried out. In two months the eyes were healed.

DISCUSSION.

Dr. F. H. Verhoeff, Boston: I had an opportunity to glance at those specimens and I believe that the staphylococcus had very little to do with the condition. It seems a secondary invasion. I think these other bodies are very important and it seems to me they are evidently the cause of the lesion. They are fairly numerous and many of them are star-like in appearance. I am strongly inclined to believe they are the cause of the condition. I would hold to the view that it was a vegetable parasite of an unusual kind.

Dr. Lucien Howe, Buffalo, N. Y.: In the copy of the Transactions which appeared 10 years ago there appears a description of a case very similar to this. A child came to the infirmary with a very similar history, the exudate was so marked that it was possible to remove it one day and the next day it would return. That child went to the blind asylum. A brother of that child became infected and had exactly the same thing develop.

Dr. Wilder, Chicago: Dr. Davis made the examinations with careful experiments for sporotrichosis, blastomycosis and various tests for aspergillus and nothing definite was obtained. An explanation of the case is, I think, a curious condition in which the individual is excreting a pigment substance, probably the tissues themselves have some chromogenic power. Possibly it may be allied to those cases in which there is a chromogenesis of the skin.

A Case of Congenital Apron of the Palpebral Conjunctiva.—Dr. Henry H. Tyson, New York.

A woman, aged 40 years. Upon eversion of upper lid of left eye the tarsal portion of the conjunctiva presented an appearance as if a fold of conjunctiva had been pinched up with forceps, and had been pressed back against the tarsus, and had adhered to it. The fold extended the entire lenth of the lid. The majority of such cases reported were from eastern Europe.

Report of a Case of Bilateral Congenital Ptosis Relieved by the Motais Operation.—Dr. B. R. Kennon, Norfolk, Va.

The excellent result secured warrants the report of this case. In a previous case the de Grandmont operation failed to correct the deformity, although the ptosis in two other cases was relieved by the Panas operation. The objection to the latter procedure is that it causes more or less disfigurement, and may leave a permanent annoying fistula. The patient, aged 6, had a congenital ptosis of both eyes of such marked degree that the lids were separated only 3 mm. at their centers, and only the lower border of the pupils showed in the palpebral fissures unless the head was thrown back about 20 degrees. The technic followed was that given by Dr. H. D. Bruns in his paper on this operation, except that the middle two-fourths instead of one-third of the superior rectus was transplanted, as the muscles seemed quite small, and, instead of cutting the stitch, it was twisted each day until it came away. Two photographs were taken, 3 years apart, the first previous to the operation, and the other about a year ago, which shows that the result is permanent. It has not changed in the least since the reaction following the operation subsided. The movements of the eyes upward are somewhat, but very slightly, impaired.

DISCUSSION.

Dr. E. E. Holt, Portland, Me.: I had a case several years ago in which three operations had been performed on the left eye. I operated very much as the author described and obtained a very good result so that the patient is satisfied.

Dr. Edward Jackson, Denver: I have done Motais' operation in 3 cases and I think that on the whole it is the most satisfactory operation for cases in which it is suited, cases of complete paralysis of the elevator of the upper lid when the eye otherwise in good condition. Like Dr. Kennon I have used about half of the middle tendon to attach to the upper lid. The last operation that I did was on a monocular case and the result I think was thoroughly satisfactory. There was a little diploplia the first few days after the operation which quickly passed away but since then there has been no complaint and it has been 2 or 3 years since that was done. For a time after the operation the effort to close the eye tightly attended with a rolling up of the eyeball caused a peculiar pulling up of the upper lid. In a case I had 5 or 6 years ago, after a few months this had passed away entirely and the control of the lids is just as perfect in this young man as in any of our lids. He closes his eyes without retraction of the lids.

Dr. H. D. Bruns, New Orleans: It is a great pleasure to me to find that somebody is beginning to do Motais operations. There was quite a period when I could see in the eyes of my audience that they listened to what I said of its advantages with a considerable grain of salt. I have done the operation 12 or 13 times. Of course I failed in my first. After some experience I had success unequaled by any other method of managing this unfortunate condition.

Discission of the Crystalline Lens.—Dr. Edward Jackson, Denver, Colorado.

The procedures for cutting or breaking up the crystalline lens are rather loosely described in our standard works on ophthalmology and they are often executed without attention to details which will determine their safety, and the success that will be attained. Discission of the lens aims to cause disintegration of the lens substance, so that it may ultimately be removed by absorption. The change in the lens substance begins with clouding and swelling. It gradually becomes more opaque, friable and liquid; and this is followed by absorption. The eye is prepared by full dilatation with atropin and local anæsthesia by two instillations of a 4 per cent. solution of cocain. Perfect steadiness of the patient is desirable and to this end some recommend general anæsthesia, but I have not encountered any serious difficulty from movements of the eyeball during the operation which has generally been done under local anæsthesia. As to the introduction of the needle I have of late years introduced it through the outer or outer lower portion of the limbus, starting one-half to 1 millimeter back from the clear cornea. The needle should be passed parallel to the plane of the iris until the edge of the pupil is reached, then with the back of the needle toward the iris the point is depressed until it touches the capsule and then is pushed directly forward as near as may be to the center of the lens nucleus. It is then directly withdrawn. This first needling generally starts the process by which the lens is to be removed and it tests the probable reaction of the eye to such interference. The passing of the needle in as far as the center of the nucleus is not of great importance in young children but it is important in older patients where a firmer nucleus is present and makes the removal of the lens by absorption slow and difficult. At the second operation the aim is chiefly to disintegrate the nucleus. The point of entrance is practically the same, but after the needle is carried into or through the nucleus it is turned and made to cut up and down so that the nucleus may be broken into several fragments. Safety and complete success were attained by allowing sufficient time. In young children three operations will usually be sufficient but in these as well as in older patients twice that many may sometimes be required. In young children it should be understood that it may take six months for the desired result while in older persons it is better to allow a year. The method is not one to be advised for patients living at a distance, nor for those who must be rid of a cataract at a certain definite time, though it is the best method and the one causing the least inconvenience or disturbance of ordinary occupation. After needling, the other eye should not be used for exacting work during the period of reaction, but it need not be closed and even the eye operated on is better freed from all dressings within 24 hours. I have had 2 patients successfully treated by needling after 40 years of age and up to that age it is to be considered a standard therapeutic resource. Under 30, if not excluded by lack of the time required, it is the method to be first considered.

DISCUSSION.

Dr. S. Lewis Ziegler, Philadelphia: I can endorse Dr. Jackson's method of making these operations on soft cataract. I must say, however, that I do not always confine myself to making the puncture through the periphery, sometimes using the cornea if I find it is wise to do so. In other words I do not think that it is so dangerous that it should always be avoided. I use my knife-needle, probably because I am more accustomed to it and make the ordinary V-shaped incision, not so large as it would be in making capsulotomy. I generally make 3 operations at an interval of 3 weeks apart. In a fixation in children if we do not wish to etherize I think there is nothing so good as a small horseshoe-shaped forceps. You can fix with this perfectly and the patient can't get away if the nurse holds the head. I do not think it is possible to do any harm to the eye with that forceps. I prefer that to etherizing under all circumstances if it is possible.

Two Cases of Chronic Glaucoma Treated by Iridotasis.—Dr. David Harrower, Worcester, Mass.

I have recently performed the operation described by Borthen (*Archives of Ophthalmology,* Vol. XL, No. 4, p. 405) upon 2 cases of chronic glaucoma with strikingly good results.

DISCUSSION.

Dr. S. D. Risley, Philadelphia: I think that what we are after here is the truth in these matters and we all come here for help and I listen with great interest to any procedure which has proved useful in any man's hands. But calling upon my own experience in other directions I would hesitate very much to wilfully perform any operation which had for its object the in-incarceration of the iris in the wound.

Dr. Samuel Theobald, Baltimore: This reminds me of a procedure introduced by Mr. Critchett, Sr., of London, which he called iridodesis. It was done where there was a central corneal opacity, the iridectomy being made for visual purposes. The iris was seized through a small opening in the anterior chamber in the periphery and a fine thread pulled through; there was a slough and adhesion to the corneal wound. It seemed to be all right. He abandoned it because every now and then a case of sympathetic ophthalmitis resulted. I do not think that the inclusion of the iris is a factor. If we get a filtering cicatrix, we keep the tension down.

Dr. Edward Jackson, Denver: I think that the point that Dr. Theobald has just made is perhaps the most important in reference to this opeartion. A subconjunctival prolapse of the iris is totally different from one where the iris is exposed outside of the conjunctiva and simply covered by exudate. If it is covered by a broad flap of conjunctiva so that the iris is quite removed from the peripheral wound, the seriousness of it is in my experience totally different. While I have not attempted to do Borthen's operation, in several cases of chronic glaucoma, where already there was complete loss of vision and where it was doubtful whether an iridectomy would give a good result, I have proceeded to drag the iris into the angle of the wound and cut it off and then drag the iris into the other corner and cut it off, and be careful to leave the iris caught in each angle of the wound. I think in every one of these cases I obtained a filtering scar and a permanent reduction of tension.

Fourth Series of Injuries from Foreign Bodies Examined by the Roentgen Rays, with Results of Operation.—Dr. William M. Sweet, Philadelphia.

Dr. William M. Sweet reported a fourth series of cases of injury of the eyes by foreign bodies examined by the Roentgen rays, with the results of operation. Of the 280 cases, the foreign body was situated in the lens in 7, in the iris in 2, in the ciliary region in 19, near the equator in 51, at the posterior part of the eyeball in 73, and in the orbit in 33. In 95 cases there was no foreign body shown by the rays. Including the cases reported previously, the total number of injured eyes was 982, in 719 of which the injury was caused by iron and steel, in 60 by copper or other non-magnetic metal, in 73 by shot, and in 32 by glass. Of the 280 cases in the present series, 65 eyes required enucleation, in 12 no operation was attempted or it failed, but the eyes were not removed; and in 23 the foreign body was in the orbit. In 20 vision of 6/12 or better was secured, 16 between 6/12 and 6/60, 5 counting fingers, 32 light projections, 5 no light perception, but eyeballs of normal size, and 7 eyeball shrunken. In 61 cases from the previous reports which had been under observation for periods from 5 to 13 years, the vision was 6/6 in 4, 6/9 in 4, 6/12 in 1, 6/18 to 6/30 in 3, 6/60 or less in 7, counting fingers in 5, good light projection in 5, imperfect light projection in 11, no light perception but eyeball of normal size in 6, eyeballs shrunken in 10. Five cases in which the eyes were saved in the previous reports subsequently required enucleation.

A Contribution to the History of the Magnet as Applied to Ophthalmic Surgery.—Dr. H. G. Sherman, Cleveland.

A foreign body in the eye is a great menace not only to the injured eye but to the other one also. On June 22, 1894, there was brought to me a girl who had had a piece of a steel pin broken from a rapidly revolving machine penetrate and lodge within the eye. The only available magnet was a small one devised by Gruening, but this gave no response. I then consulted Mr. Hammer, of the Brush Electric Light Plant and requested him to make a magnet of sufficient power. He directed his chief electrician, Mr. Adams, to construct a magnet. This consisted of a bar of Norway iron, 18 inches long and 3 inches in diameter, wrapped with hundreds of feet of fine copper wire, properly insulated. The magnet was energized by the current from the street, the voltage being sufficiently reduced by a transformer and a rheostat of 30 coils of iron wire. The patient's head was brought within 6 inches of the magnet and the current turned on. I had not thought of removing the body except by incision, the magnet being used for diagnosis only, but some hours later the patient complained of a pricking sensation under the lower lid and search revealed a black point sticking through the sclera. This was removed by a slight incision and in a week the patient was well. This magnet was stronger than that of Haab, which was at that time unknown to me. Although a report was made by me in the *New York Medical Record,* Vol. 48, p. 212, no mention is made of this magnet in the literature referring to this subject.

(The above two papers were jointly discussed.)

DISCUSSION.

Dr. Samuel D. Risley, Philadelphia: I rise simply, not to discuss the entire subject of removal of foreign bodies, but to call attention to a paper which I presented before the Society several years ago, insisting upon it that these foreign bodies should first be localized and then removed from the scleral juncture and in that paper I pointed out the many reasons for this. If a foreign body should be drawn into the anterior chamber by any devious route it might select, we would only increase the canal and increase the virulency of any infection it might have. Unless the foreign body is in the anterior chamber or lens itself I have never removed the foreign body from the eye with anything but puncture. Dozens of times I have been able to touch the foreign body itself with the point of my knife when I made the scleral puncture and have picked it out.

Dr. E. E. Holt, Portland, Me.: I think I was the first to present a series of cases of removal of foreign body from the eye in the early 90s. I used the magnet modified by Hirschberg. The earlier we get at the piece of steel in the vitreous the better it is for the eye. If you get severe pain after removing a piece of metal from the interior of the eye and the eye begins to soften, I do not think there is any use in trying to save the eye.

Dr. Edward Jackson, Denver: Blindly setting a powerful magnet to draw out a foreign body of unknown size and position is not worthy of the present stage of development of ophthalmology.

Dr. John E. Weeks, New York: The tendency this morning is to advocate the removal of foreign bodies through the sclera. Prof. Haab, as you know, takes the opposite view. I really think that there is a great deal of merit on both sides, but I do not think we ought to make any firm rule in regard to the course, the tract, through which we should remove a foreign body. I think every case should be decided on its merits and in many cases we can do less injury by removing through the anterior chamber than through the sclera, choroid and retina. In not a few cases the removal of a foreign body by the route through the anterior chamber is attended by almost no traumatism. Simply the passage through the zonula, and the foreign body is brought into the pupillary area and removed through an incision in the cornea. The round pupil is maintained and the injury is at a minimum. I would suggest that no fast rule be entertained, but every case be treated on its merit.

Dr. W. E. Lambert, New York: I would emphasize what Dr. Weeks said, that we cannot lay down any hard and fast rule. There is one point I would mention as an important factor in selecting the method, that is, as to the size and form of the foreign body and somewhat dependent upon the length of time it has been in the eye. I agree with Dr. Weeks entirely that we meet many cases where the foreign body is small, that the extraction through the anterior portion of the eye is the best method and have had a number of cases where it has been satisfactory. On the other hand, to get a ragged piece undoubtedly one should go in through the sclera. I had quite recently a most satisfactory case of that character. That simply means, therefore, that the observation made by the x-ray is an important guide as to the method we should follow in these cases.

Dr. S. C. Maxson, Utica, N. Y.: When a foreign body has been drawn into the anterior chamber, if you attempt that route, and by accident you foul the iris, you must be exceedingly careful after you have made your incision not to apply the magnet again. The chance is that if you do you will pull the iris out with the foreign body. I would have had this accident had it not been for a remark made to me by a member of this Society a number of years ago when the subject was discussed. He spoke of what to do next if you had the misfortune to draw the iris out. Soon after this I did the operation and it fouled the iris and I remembered what the man said. I made the incision with a keratome and slipped the foreign body out and made an iridectomy and had an almost perfect result. I would call attention to the danger of applying a big magnet. I have a little magnet and instead of carrying under my arm I suspend it by a pulley where I can elevate to my liking.

Dr. Peter A. Calan, New York: Every case must be handled individually according to the circumstances, point of entrance, size, location and length of time, everything must be taken into consideration Ever since Haab has shown the method of bringing the body around into the anterior chamber I have followed that method, except in a very few instances and I think I have been successful. When you get the object into the anterior chamber, stop the use of the big magnet and with the small magnet bring the body around on the iris directly under the point you want to make the corneal incision. Make the corneal incision and apply to that opening the small magnet and it jumps out without bringing the iris into the wound. I do not mean to say we should not go by the scleral route. Let each man decide for himself what he is best adapted for.

Dr. H. C. Sherman, Cleveland, O.: I hope that someone will be able to elucidate a few points which are very obscure to me. Before I modified this very large magnet I made a series of experiments placing foreign bodies in pigs' eyes and using the magnet at various distances. In every instance in which I have attempted the use of the powerful magnet I first saw the iris bulge or the lens torn into the anterior chamber, I saw the suspensory ligament damaged and it caused a cold chill to go up my back, and I stopped the use of the magnet in that form. I do not see why any man can draw it so beautifully and gradually and pass it along just as you would guide a little lamb by a string. Any magnetic line of force goes along the line of least resistence straight and like a dash. The impaction is something terrific.

The Experimental Production of Sclerokeratitis and Chronic Intraocular Tuberculosis (with lantern demonstration.)—Dr. F. H. Verhoeff, Boston.

When dead tubercle bacilli are injected into the vitreous humor or anterior chamber of a rabbit they produce after about three months, lesions in the corneo-sclera closely analgous to those of tuberculous sclero-keratitis in man. Smaller tubercles are produced on and within the iris and still smaller ones on and within the ciliary processes. The latter are of special significance as they indicate that the foci in human cases of tuberculous cyclitis are not necessarily due to direct metastases from the blood. Tubercles of the choroid are also produced, due to bacilli passing from the filtration angle along the supra-chorioidal space.

These observations confirm the theory previously advanced that tuberculous scleritis and keratitis are due to infection from the aqueous humor through the filtration angle. They also strongly suggest that the chronic types of tuberculous iritis and cyclitis, and possibly chorioiditis, are likewise due to metastases from the aqueous humor, the bacilli reaching the latter from the vessels of the ciliary body. The lack of immune substances in the aqueous humor no doubt increases the chances for such metastases to occur. In addition, these observations suggest certain procedures in regard to treatment.

On Some Forms of Retinal Tuberculosis.—Dr. Arnold Knapp, New York.

Apart from the periphlebitic processes in the retina of adolescents and the cases of deep retinal exudation, there are forms of retinal tuberculosis which seem to involve the superficial or internal layers of the retina. Of this latter variety I report two cases.

The first was in a boy of 19 years, who consulted me because the sight of the right eye had been blurred for several days. V. was 5/200. There was a central scotoma. The sight of the left eye was normal. In the right eye the optic disk was swollen and inflamed and surmounted by a small hæmorrhage. The macular region was occupied by a perfect star-like figure, the radiations of which were composed of glistening, silvery, interrupted lines. The diagnostic injection gave a positive reaction. Two days later many small round white areas were seen about the disk and the large retinal focus. Tuberculin treatment with the bacillary emulsion was instituted and about six weeks later the main focus was nearly gone and a distinct connective tissue formation was taking place. The macular figure was reduced to a few radiating lines in irregular areas. Three months later nothing remained in the macular region except some shining dots and superficial pigment. The vision had improved to 15/200, but there was still a central scotoma. The rapid and continuous improvement under tuberculin treatment confirmed the diagnosis of a tubercular lesion.

The second case was a patient 22 years old, who was seen because of failing sight in the right eye of one week's duration. Vision in the right eye was 8/200 with a central scotoma; that of the left eye normal. There was in the right eye a white exudate composed of rounded areas along the course of a macular vein. A positive reaction to tuberculin was obtained. Tuberculin treatment was instituted. But in spite of this the lesions extended along the course of the bloodvessels for a time, but later absorption and transformation of connective tissue progressed slowly and four months later only two exudates were visible and these reduced one-half in size. The vision has increased to 18/200, the central scotoma persisting. Considering the extent and severity of the process in these cases the outcome must be regarded as very favorable, for which result the tuberculin treatment was probably in great part responsible.

(These two papers were discussed jointly.)

DISCUSSION.

Dr. Hasket Derby, Boston: Dr. Verhoeff's experiments suggested the possible benefit of puncture of the anterior chamber in cases of tuberculosis of the anterior segment of the eye. I have done this a number of times. On one case with beginning infiltration in the cornea following a very marked scleritis I have done the puncture 4 times and apparently the process has been entirely arrested. I have done it twice on another case and on one or two others and it certainly seems as if it were a procedure of value. There has never been any severe reaction from it and the next day the eye is no more inflamed than before the puncture was done and very often it has been less inflamed.

Two Unusual Orbital Conditions—Dr. William Campbell Posey, Philadelphia.

Case 1.—Chronic inflammatory tumor, with cyst and giant-cell formation, in the floor of the orbit and connected with the lacrimal sac, arising after false passages of lacrimal probes. As the mass threatened the integrity of the globe from pressure, it was removed under ether. Macroscopically: Cyst without capsule or definite limitations from the surrounding tissues. Histologically: A fibrous stroma with occasional small collections of lymphocytes, numerous small cysts, and foreign-body giant-cells. The pathologists were of the opinion that the mass should be regarded as the reaction of the tissue in the injured area to some form of foreign-body irritation.

Case 2.—Large lacrimal mucocele, occasioned by pressure exerted externally by the distended walls of the anterior ethmoidal cells, in consequence of the retention of mucus within that cavity. Extirpation of the sac was followed a year later by another swelling. The orbital tissues were incised, and a large mucocele was found projecting from the inner orbital wall. The ethmoidal cells were opened and free drainage established into the nose by a rubber tube. The case exemplifies the condition designated by Peters in 1902 as pre-lacrimal tumor, the ectasia of the sac being occasioned by a stoppage of its orifices by pressure exerted externally from the inflammatory products or by the walls of neighboring sinuses.

(*To be Concluded in August Number.*)

EXAMINATION OF THE EYE WITH THE NERNST LIGHT.

Jean Staehl (*Beiträge für Augenheilkunde,* December, 1912) finds that oblique illumination with the Nernst light yields much better results than with the ordinary light. Very minute lesions on the cornea and iris can be recognized by the aid of a binocular loupe with this light. Since using it he has found traces of the pupillary membrane much more frequently than formerly, finding them present in more than sixty per cent. of the cases he has examined.

THE ROYAL SOCIETY OF MEDICINE.

SECTIONS OF OPHTHALMOLOGY AND NEUROLOGY.

At the meeting of these Sections on March 5th, under the presidency of Sir Anderson Critchett, C.V.O., the subject of the discussion was

Disease of the Pituitary Body.

Professor Schäfer opened with a very detailed exposition, aided by numerous slides, of the structure and functions of that body. He said the pituitary body was present in all vertebrates which had been examined, therefore it must be an organ of considerable morphological interest. Its development occurred as an extension of Rathke's pouch, which was an invagination of the buccal ectoderm towards the brain. This was met by a hollow downgrowth from the thalamencephalon, and the combination of the two into one organ formed the pituitary body. The gland consisted of three parts: (1) pars anterior, (2) pars intermedia, (3) pars nervosa. Usually it was described as consisting of two parts—the anterior and the posterior lobes. Remarkable alterations occurred in the pituitary as the result of thyroidectomy, and similar changes seemed to result where atrophy of the thyroid ensued. The alterations after thyroidectomy included (1) enlargement of the pituitary body; (2) the presence of a colloid substance in the vescicles in the pars anterior, and a great increase in that of the pars intermedia; (3) a great increase in the number of hyaline bodies in the pars intermedia and the pars nervosa. It was not easy to explain these changes physiologically, because the functions of the two glands were not identical, though both were probably connected with sexual development, for in the case of removal of either there was a stunting of growth and sexual infantilism. Moreover, castration had been followed by hypophysial hypertrophy. The greatest enlargement of the pituitary body was found in giants and acromegalics; the skeleton of giants was characterized by a disproportionately large sella turcica.

The physiology of the pituitary body had been investigated experimentally by methods of removal and of addition, the latter by administration of extracts of the gland, and by implantation. The evidence following removal was conflicting. Young animals which survived extirpation had their growth retarded and their sexual activities remained undeveloped. But some observers stated that total removal was not fatal, death (when it occurred) having been due to the complications of the operation. Mere injury of the pituitary might cause marked polyuria, but it disappeared after a few days. Possibly this was the explanation of the polyuria sometimes seen in association with fracture of the base of the skull. Feeding with fresh or dried gland substance was normally not attended with any obvious result, even in growing animals. There was certainly no retardation of growth, such as had been described. Attempts to graft the organ had been unsuccessful. Saline extracts of pituitary, injected intravenously, had a marked effect upon all involuntary muscles; they caused constriction of most of the bloodvessels of the body, a powerful and usually slowed action of the heart, the tone of which was increased, contraction of bladder, uterus and bowel, and dilatation of the pupil in the frog. The substance producing these results was of a relatively simple nature, was soluble in water, and dialysable, and was not destroyed by repeated boiling, nor by long keeping in a dried state or in a sterilized condition. It was insoluble in alcohol or ether. Intravenous injection of pituitary extract excited secretion in certain glands, such as the kidney, and in the mammary gland during lactation; there was dilatation of the renal arteries, though the effect on the general arteries of the body was constriction. The substance producing effects upon bloodpressure, heart and kidney was contained only in the posterior lobe, and it had been found in the cerebrospinal fluid. According to the observations of Ott, Scott, and Mackenzie, the galactagogue hormone of the pituitary was also confined to the posterior lobe, and it was assumed to be identical with that which caused the other effects upon bloodvessels, heart, and kidney. The anterior lobe seemed related to the general growth of the body, especially that of the skeleton; while the posterior, including the pars intermedia, probably promoted the contractility and increased the tone of plain muscular tissue.

Mr. J. Herbert Fisher commented on the complexity of function of the two portions of the pituitary body, and the supreme importance of the gland to life, and its interactions with other ductless glands. Colloid was also formed, as in the case of the pituitary, by rare tumors which sometimes developed in the remnants of the post-anal gut. He also remarked on the fact that castration and oöphorectomy caused some overgrowth of the pituitary body, while the hypophysis enlarged during pregnancy. He believed the climacteric was prematurely reached, or impotence in the male, by months, and even years, before other symptoms pointed to disorders localized to the hypophysis, and in this direction, observations of gynæcologists might be of value. Hypoplasia of the adrenals was also accompanied with excessive development of secondary sexual characteristics.

A case exhibited by Dr. Turney showed pituitary disorder with adiposity and abnormally raised bloodpressure, undue pigmentation of skin, and liability to spontaneous bleeding. For diagnostic purposes, the ophthalmic surgeon worked chiefly with his perimeter in recognizing and watching pituitary disease. The typical condition was one of bitemporal hemianopsia; though that statement did not cover the question, cases had been recorded in which a central scotoma resembling that seen in tobacco amblyopia existed, but in which the extension of the scotoma resulted in bitemporal hemianopsia. He did not see how pituitary tumors could press first at the anterior angle of the commissure. X-rays were very serviceable in proving or negativing the existence of bone erosion. Mr. Doyne had shown that hemianopsia of the color sense might precede that of the form sense, and give a guide to prognosis; and with that Cushing agreed. In a proportion of cases of pituitary body enlargement, homonymous hemianopsia was a symptom in the earlier development of the case, but he was convinced that an evenly-balanced loss of the temporal field in each eye of simultaneous onset was the exception. Direct pressure on the optic chiasma, so glibly invoked, was far from being a satisfactory explanation of most of the cases. He asked whether neurologists believed that the anosmia present in some pituitary cases could be attributed to involvement of the uncinate gyrus. He believed the visual phænomena were explicable by traction effects on the visual pathways as the tumor extended behind the chiasma and between the optic tracts in the inter-peduncular space. For operation, he favored a route through the fronto-temporal opening of the cranium. If this method were pursued, the free removal of the bone and opening of the dura mater on the opposite side allowed more freedom for elevation and displacement of brain, and thus gave more ready access to the pituitary region.

On March 12th the discussion was resumed by Dr. Turney, who discussed at length a case which had been under his care, and whom he showed at the last meeting. The symptoms referred mainly to the posterior lobe. The patient was a lady, æt. 25, who until 1907 was in no way abnormal. Before that time her menstruation had been regular, but since then it had been entirely absent. Her friends remarked on her increasing stoutness, and during the last two years she noticed she bruised with unusual readiness, especially on the legs. She also had pain in the back, starting from the kyphotic curve in the upper dorsal region and traveling round the ribs. Mentally she seemed unaffected, and her sight remained good, except for the slight error of refraction which she had always had. Thyroid extract had been administered repeatedly, but had to be given up on account of palpitation. In spite of the obesity present, her weight was now less than formerly; her face was fat and florid; there was no puffiness about the eyes. The hair was dry and somewhat scanty, but the eyebrows were present. The expression was bright, and manner alert, skin not pigmented; pubic and auxiliary hair scanty. The upper limbs were of normal size, but lower limbs and buttocks thin. The thyroid was normal in size and consistency. No evidence of enlarged thymus, lymphatic glands, or spleen. X-ray examination showed absorption of posterior clinoid processes. There had never been intracranial pressure or involvement of the nervous system. In July, 1912, Mr. J. H. Fisher reported that the white, blue, and red fields were not transposed, and there was no certain evidence pointing to the probable development of temporal hemianopsia. On recent examination, surrounding four-fifths of the right disc there was a sub-retinal exudation of glistening character and ill-defined limits; no blood there at present except two or three very fine spots on the white area; otherwise each fundus was normal. The blood pressure on admission was 200 mm. of mercury, and it had remained at about that level ever since. There was a tendency to polycythæmia, without other blood changes. At one examination the red cells reached eight millions. There had been a spontaneous fracture of the sternum between the manubrium and the gladiolus. The urine was normal, and there was no polyuria. The sugar tolerance limit was normal at about 120 grammes of lævulose. Professor Dixon had examined the urine, and found it to contain a pressor substance in considerable quantity; 10 c.c. of the urine injected into a cat raised the bloodpressure 70 or 80 mm., whereas a similar injection of normal urine would lower the bloodpressure nearly to the base-line. Dr. Dixon added that this patient's urine contained 100 times the pressor substance found in normal urine, and that it corresponded closely with the urines of cases he had examined of acromegaly. Extract of posterior lobe was given, at first subcutaneously, but this method had to be abandoned owing to the tendency to superficial necrosis. She showed no increased tolerance to carbo-hydrates. The presence of the pressor substance showed that the pituitary secretion was in excess. Dr. Turney discussed the case fully, his conclusion being that the patient had a pituitary-sexual-gland syndrome, the lesion being in the posterior lobe of the pituitary. A possible alternative was that there was a temporary failure of the element controlling carbo-hydrate metabolism.

Professor Dixon, F.R.S., detailed his findings in a man the subject of acromegaly of ten years' duration. He had an enormous heart, but no rise of bloodpressure. On injecting 1 c.c. of the urine into a cat, the bloodpressure went up, and the injection of 5 c.c. caused to to rise to 80·mm. The active substance was urohypertensin. The man died suddenly as a result of some extra exertion, and post-mortem the pituitary body was found to be the size of a walnut. The heart weighed about three pounds.

Dr. A. Garrod, F.R.S., gave a description of a case in which myxœdema and acromegaly probably co-existed. The improvement under thyroid treatment left no doubt as to the thyroid defect. The evidence of acromegaly was less conclusive. A skiagram showed enlargement of the sella turcica.

Dr. William Hill discussed the best route for operative treatment of pituitary tumor. He did not favor that advocated by Cushing, perferring that followed in submucous resection, and then taking the short, though dangerous, further step. The chief danger was that of wounding the optic chiasma. The Hirsch operation was simpler than that of Cushing, and Mr. Graham and he both found it gave good access to the tumor. He gave a word of warning as to the dangers of the operation, especially without exhaustive preliminary study.

Dr. Langdon Down discussed the subject, and showed photographs of a case.

Mr. Richardson Cross (Clifton) drew attention to the importance of the inter-relation of the various glands of the body in the economy, particularly ovaries, testes, pituitary, pineal, suprarenals, thyroid, thymus. He had found great benefit from the administration of thyroid and pituitary extracts.

Dr. F. E. Batten and Dr. Grainger Stewart also took part in the debate.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

A REPORT OF NINE CASES OF OCULAR SYPHILIS TREATED BY SALVARSAN ("606").

Frederick E. Cheney (*Boston Med. and Surg. Jour.*, Dec. 21, 1911) reports four cases of uveitis and five of interstitial keratitis due to syphilis, treated by salvarsan. He summarizes the results as follows:

In the two cases of acute iritis with a condyloma, the rapid subsidence of the inflammatory symptoms and the disappearance of condyloma was most interesting and impressive to observe. These patients do, of course, get well quickly at times under mercury and iodid of potassium, but that salvarsan will prove more valuable in the treatment of this class of cases certainly seems probable. The deposits on the membrane of Descemet in the second case did not disappear rapidly, but such deposits, unless increasing, in no way indicate that the inflammatory process has not come to an end. In the third case, a chronic general uveitis, the inflammatory symptoms had entirely disappeared eleven days after the salvarsan injection, and this was certainly a satisfactory result in a case of this nature. A rapid disappearance of the vitreous membranes, however, was a hope not realized and hardly to be expected.

In the fourth case, a low form of long-continued general uveitis, there was no immediate result following the use of salvarsan. It was an eye in which the products of past inflammatory attacks were much more in evidence than an existing inflammation, and the remedy was given with little expectation of immediate benefit, but rather with the hope of preventing future exacerbations and further impairment of vision. The improvement found in the vision and the condition of the vitreous when he reported November 1 was certainly gratifying.

Concerning the cases of interstitial keratitis he says:

In the first case, so far as can be judged, the course of the disease was in no wise influenced by salvarsan. In the four other cases, the rapid disappearance of circumcorneal injection, of intolerance of light and lacrimation (well marked in three of these four cases) following the salvarsan injection would seem to be more than a simple chance happening. As to the clearing of the corneal infiltration, there was no indication of any exceptional rapidity in three of the cases. In the other case (Case VI), the cornea certainly cleared more rapidly than usual. There was an infiltration involving the entire surface and the vision equaled 20/100. Seventy-two days after the first signs of irritation were noticed by the patient and forty-two days after the salvarsan injection, this infiltration had entirely disappeared with the exception of a very slight central haze and the vision equaled 20/20. On the other hand, it must be said that the infiltration of the cornea at no time was of extreme density and that a certain number of cases with no special treatment do make equally good recoveries. On the whole, it would not be wise to conclude that salvarsan was responsible for the rapid clearing of the cornea in this case. It is going to be difficult to form accurate conclusions as to the value of the salvarsan in this disease because of the variability of its course. If, however, a good number of these cases can be treated early, that is, at the beginning of corneal infiltration, carefully observed and accurately reported, it will probably be possible after a few years to arrive at a fairly definite appreciation of its value.

INFLUENCE OF SEPTIC INFECTION IN THE CAUSATION OF EYE DISEASE.

B. T. Lang (*Brit. Med. Jour.*, Feb. 22, 1913) calls attention to the obscurity of the cause of the great majority of cases of scleritis, keratitis, iritis, cyclitis, and chorioiditis, and the fact that recently these cases are looked upon as being due to the chemical effects of bacteria or their toxines, which reach the eye through the blood streams. Inasmuch as direct evidence that bacteria are present in such cases cannot usually be found he bases his opinion on indirect evidence, but he is convinced that the ocular lesions in such cases are caused by some exciting substance brought to the eye by the circulation from some septic focus in the body. He makes his deductions from a total of 176 cases, a number of which he reports briefly in illustration of his contention. He has found the foci of infection in one of three situations: 1, Along the respiratory or alimentary tracts; 2, along the genito-urinary tract; or 3, on the skin or in a sinus leading from it. Many of his cases were cured solely by treatment of the septic focus. The author suggests that senility and myopia do not cause chorioiditis, as seems to be so often thought, but that in these conditions there is a reduced resistance of the chorioidal tissues which makes them favorable locations for infection.

BOOK REVIEWS.

THE OPHTHALMIC YEAR BOOK, Vol. IX, containing a digest of the Literature of Ophthalmology for the years 1911 and 1912. Edited by Edward Jackson, M.D. Illustrated. Herrick Book & Stationery Co., Denver, Colorado, 1913.

The ophthalmological profession is to be congratulated on the fact that the apparently defunct year book has been resurrected. May it be given to the editor to keep it alive for a long time!

We heartily welcome this, like its preceding volumes. It should be in the hands of every ophthalmologist. The present volume is graced by a picture of Dr. Hermann Knapp, a tribute to one whose name will ever be among those of the foremost ophthalmologists of the world.

The staff of assistants has been greatly enlarged. The text is preceded by biographical notices of ophthalmologists who have died in the last two years.

THE AMERICAN ENCYCLOPEDIA AND DICTIONARY OF OPHTHALMOLOGY. Edited by C. A. Wood, M.D., C.M., D.C.L. Assisted by a large force of collaborators. Fully illustrated. Volume I. A. to Azoviolett. Chicago, Cleveland Press, 1913.

As previously announced this first American Encyclopedia and Dictionary of Ophthalmology, is intended to be as complete as it can possibly be made. Ten volumes are to be the scope of this work. The first volume before us comprises all subjects under the letter A. The mass of material carried together in this volume is enormous, almost bewildering. If continued in this manner, the encyclopedia will surely be a library in itself, which every oculist and every library should possess. We congratulate both Editor and Publisher. ALT.

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TRANSLATIONS.

SOME EXPERIMENTS CONCERNING THE LYMPH VESSELS OF THE EYE AND THE ORBIT.*

By M. Leboucq,
GAND, BELGIUM.

Translated by A. Alt, M.D.

The lymphatic circulation as established by Leber's works has of late been seriously shaken. Hamburger's researches especially have shown that the aqueous humor is in the main secreted by the anterior surface of the iris. The elimination of this fluid, according to Hamburger, takes place by extremely slow diffusion through the walls of the veins of the iris, the canal of Schlemm, and from there into the anterior ciliary veins. In a recent paper Hamburger[1] even no longer recognizes the latter route and vouchsafes to the iris veins alone the role of absorbing the aqueous humor. In 1911 Weiss[2] published a paper in which he proves that the tension in the interior of the veins is considerably higher than the intraocular tension; therefore, no transudation can take place into Schlemm's canal or the other veins.

The experiments which I have made have convinced me that there is in the eye and in the orbit a lymphatic system for the outflow of the aqueous humor and completely independent of the venous system.

The following experiments were made:

I made a great many injections into the anterior chamber and the vitreous body of rabbits. The injections into the anterior chamber were made by introducing the needle of a Pravatz syringe 2 mm. behind the limbus and by passing it just behind the iris into the pupil. In this manner no aqueous humor escapes.

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*Preliminary notes of a paper which will appear in the Archives de Biologie.—Bulletin de la Société Belge d'Ophtalmologie, April 27th, 1913.

The substances which I injected were watery solutions of crystalloids and colloids which could be found in the sections by means of precipitation; then olive oil, which was found by fixing the pieces in osmic acid; finally, solid bodies in suspension, like China ink, the carminate of lead, colloidal silver and gold leaf.

These experiments were brought to end by ligating the lymph vessels of the neck in order to demonstrate the continuity between them and the lymph vessels of the eye or orbit.

A.—INJECTIONS INTO THE ANTERIOR CHAMBER.

(1.) *Crystalloid solutions.*—Crystalloid solutions are not satisfactory because they are likely to diffuse through all the tissues. A most remarkable example of this diffusion was given by employing nickel salts which are precipitated in red needles of dimethylglioxine.

The precipitates are found even in the interior of the arteries.

(2.) *Injections of colloid solutions.*—The colloid substances are equably diffusible, but they show a much greater predilection in their diffusion. I have used 1 per cent. solutions of sodium carminate, cyclamin, Bengal red, etc., which are found in the sections after precipitation with silver or lead salts. The injected material has penetrated into the deep layers of the cornea, into the iris, largely into the spaces of Fontana; from there it has diffused into the sclerocorneal tissue surrounding Schlemm's canal and the anterior ciliary veins. It has not penetrated into the veins of the iris or of the limbus, including Schlemm's canal, nor into the posterior chamber, nor the vitreous body and perichoroidal space.

(3.) *Injections of olive oil.*—Sterile olive oil gives the best and most characteristic results. Its elimination is extremely slow and it causes no inflammatory reaction.

Five or six weeks after the injection of one drop of olive oil into the anterior chamber evisceration of the orbital contents is made, and these are fixed in Flemming's osmic fluid. The smallest trace of oil can be found by the black color due to the reduction of the osmic acid.

The following is the process of elimination:

(*a*) Slow and partial emulsion of the drop of oil due to the slight alkalinity of the aqueous humor, beginning 10 to 15 days after injection;

(*b*) distribution of the emulsified droplets in three directions: (1) against the posterior surface of the cornea without piercing ing Descemet's membrane; (2) into the spaces of Fontana through the trabecules of the ligamentum pectinatum; (3) into the iris stroma through pupillary stomata located where the mesodermic and ectodermic parts of the iris join each other.

In this case the droplets traverse the whole of the iris stroma and penetrate into Fontana's spaces through the peripheral stomata which open behind the ligamentum pectinatum.

At the same time with the emulsion and distribution of the droplets, the leucocytes come from the iris capillaries and migrate through the anterior surface of the iris. The bloodvessels of the ciliary body do not participate in this diapedesis.

The leucocytes by chemotaxis are in small numbers attracted to the foreign substance and begin their work of phagocytosis immediately in the anterior chamber.

The phagocytosis is especially active in Fontana's spaces where the droplets are retained. They are too large to pass through the normal channels of elimination in the sclera; thus they are attacked by the leucocytes whose protoplasm is charged with a large number of microscopical oily particles; the phagocytes then enter the lymph space surrounding Schlemm's canal and the anterior ciliary veins and in this way get outside of the sclerotic. Here, since the perivenous sheaths are much larger, the lymphatic current is almost *nil.* From this an accumulation of phagocytes results which die, disintegrate, and thus set free the oily particles having been retained in their protoplasm. These coalesce and again form, sometimes voluminous, drops lying in the lymphatic spaces lined by endothelial cells.

The presence of the animal fat outside of the globe prevents the recognition of the final route followed by the vegetable oil, since both of them appear black from osmic acid.

The oil is eliminated exclusively by the routes just described. It is never found inside the veins, in the posterior chamber, in the vitreous body, in the perichoroidal space; it never penetrates outside the globe into the subconjunctival space or Tenon's space.

(4.) *Injection of solid bodies in suspension* (China ink, carminate of lead, colloidal silver).—Such bodies brought into the anterior chamber very quickly clog all the normal passages for the outflow of the aqueous humor. This obstruction and the inflammatory phænomena which accompany it cause grave disorders in the intraocular circulation. The results from this form of experiment belong into the realm of pathology and can cause only erroneous conclusions; I may mention penetration into the vitreous body, the perichoroidal space and infiltration of the cornea.

B.—INJECTION INTO THE VITREOUS BODY.

These experiments prove that the substances introduced into the vitreous body leave the globe exclusively by the posterior channels. The anterior and posterior lymph circulations are independent of each other.

Since the anterior segment of the rabbit's eye is very large the injection must be made behind the æquator of the globe, otherwise the injected material will diffuse into the posterior chamber and be taken up by the anterior circulation.

The same substances were used as before.

(1.) The crystalloid solutions behave in the same manner as they do in the anterior chamber. They diffuse into the meshes of the vitreous body, pass through the zonule and thus reach the anterior segment; they infiltrate the retina and choroid and the perichoroidal space; finally, the greater part passes out through the papilla and is found as well in the interior of the bloodvessels as in the perivenous lymph spaces.

These diffusion phænomena are not physiologic.

(2.) The colloid solutions give much more characteristic results. For instance, the elimination of carminate of sodium takes place exclusively by way of the lymph spaces surrounding the central vein in the optic nerve. The zonule of Zinn forms a complete barrier to a forward flow of these liquids.

The internal layers of the retina are impregnated; the coloring matter travels along Mueller's fibres to the external granular layer only. There is no trace of it in the choroid, the perichoroidal space or the vorticous veins.

(3.) Olive oil injected into the vitreous body is eliminated even much more slowly than from the anterior chamber. It takes several months for one drop. The process of elimination is identical with the one described after anterior injections. The drop is at first emulsified, then the droplets are taken up by phagocytes coming from the posterior part of the ciliary body.

The leucocytes charged with oil then leave the globe through the lymph spaces of the papilla and the optic nerve. These are the only routes followed by them to the exclusion of all others.

(4.) Solid bodies in suspension introduced into the vitreous body do not produce glaucomatous symptoms, but symptoms of phthisis of the globe by liquefaction of the vitreous body. If a small injection has been made behind the æquator the injected material does not get into the anterior segment. The phagocytes, much more abundant than with oil, attack the foreign substances. They come solely from the capillaries of the posterior part of the ciliary body and of the ciliary retina as far as the ora serrata. The injected material and the leucocytes leave the eye by the lymph vessels of the optic nerve.

Under normal conditions the foreign substances never penetrate into the perichoroidal space; we may therefore conclude that it constitutes an independent lymph cavity in the eye. If the injection is made directly into this space, the injected substances pass into the lymph sheaths of the vorticous veins, but never spread into Tenon's space.

Of the four groups of substances used, two are unfit for the study of the normal route of the intraocular circulation; the crystalloid solutions which diffuse indifferently into all the tissues cannot be assimilated by the fluids secreted by the organism; the solid bodies cause pathological changes within the eye. There remain, then, the colloidal solutions and olive oil.

The experiments made with these two give virtually the same results; the elimination takes place not by the veins but by the perivenous spaces. Since the introduction of these substances into the eye produces no noticeable disturbances and does not seem to modify the physiological condition in anything, we may rationally conclude that they leave the eyeball by the normal channels for the elimination of the intraocular fluids.

Ligation of the lymph vessels of the neck.—As previously stated the presence of the fatty tissue does not admit of following the route taken in the orbit by the fat injected into the globe. Yet, it would appear important to know what the perivenous spaces lead to after having left the episcleral tissue.

To this end I have resorted to ligation of the lymph vessels of the neck. About a quarter of an hour after the subcutaneous injection of fluorescein the lymph vessels become easily visible by their greenish yellow color.

A ligature is passed around the lymph vessels accompanying the external and internal jugulars, on one side. It is important that the external lymph vessel is, also, ligated, because there is almost constantly an anastomosis between the two vessels, as R. Boddaert[3] has shown. After these ligations Ehrlich's line can be seen to disappear more slowly from the eye on the ligated than on the other side. When both eyes have lost their green color a new injection of fluorescein is made under the skin of the abdomen, and the following observed:

After ten to twenty minutes Ehrlich's line is found as usual on the normal side; on the other side the phænomenon described by Hamburger, and which he called "Ventilverschluss" (valve closure),[4] can be seen with the greatest nicety. At the margin of the pupil, mostly upwards, a very small green point appears; this point grows larger and then pretty rapidly spreads into the aqueous humor. A few minutes later another point appears, then a third, and this phænomenon repeats itself until the coloration of the aqueous humor is so dense that it hides the pupil and iris.

The normal eye during this time becomes much less colored. In a few hours it has lost the color, while the other eye still shows the fluorescein plainly. After twenty-four hours the evidences of the experiment are still in progress. Two or three days later it has lost its characteristic nicety and does no longer strike an unprepared observer.

The reverse experiment consists in ligating the external and internal jugular veins, leaving the lymph vessels intact.

In this case the coloration persists slightly longer in the eye on the side of the ligatures, but the difference cannot be compared with the one following the ligature of the lymph vessels.

This retardation in the lymph circulation can be explained by the venous congestion which may obliterate the perivenous lymph spaces.

These experiments prove then that the aqueous humor is poured into the spaces surrounding the anterior ciliary veins, in the orbit these sheaths are continued by lymph vessels which are emptied into the jugulary lymph trunk of the neck. In fact, these lymph vessels in the orbit, the existence of which has always been denied, are thus put in evidence. In order to do so I have made use of Professor O. Vander Stricht's process, which consists of fixing the organs in place so that no fluid can flow out when they are cut. Young rabbits, 2 or 3 months old, are hung up for a few minutes head downward, then strangled by means of a cord; the head is then cut off without disturbing the ligature and plunged into a large quantity of some fixing fluid (Müller, Zenker, etc.).

When the specimen is fixed the contents of the orbits are eviscerated and treated in the usual manner. Under this treatment all nourishing fluids are held in place; the veins and arteries of the orbit are filled with coagulated blood, the smallest capillaries are recognizable by the presence of the formed elements of the blood. Besides the bloodvessels the lymph vessels are plainly visible, distended by lymph and lined by their characteristic endothelium. Such lymph vessels are found all along the principle veins.

CONCLUSIONS.

From these experiments we can conclude that in the rabbit:

(1.) There is an intraocular lymph circulation.

(2.) That this circulation takes place in the following manner:

(*a*) The aqueous humor of the posterior chamber is secreted by the anterior ciliary processes; that of the anterior chamber comes from the anterior surface of the iris, especially at the large and small arterial circles (Hamburger, Wessely).

(*b*) The aqueous humor is very slowly eliminated. That from the posterior chamber is poured into the anterior probably through the pupil; a minimal part passes through the endothelium and Descemet's membrane and nourishes the deepest layers of the cornea; another part enters the iris through the pupillary stomata and perhaps through certain places in its anterior surface. The largest part goes to the iris angle and Fontana's spaces, into which the lymph from the iris stroma is also directed.

At this locality the liquid flows out into the lymph spaces surrounding Schlemm's canal and the anterior ciliary veins.

Into these spaces furthermore other lymph lacunæ are emptied, which come from the sclerotic and the cornea; these lacunæ lead the lymph of the cornea into the perivenous spaces. Having passed through the limbus the spaces continue on in the shape of lymph vessels, first surrounding, later on accompanying, the veins; these empty into the jugulary vessels which accompany the inner jugular vein.

(*c*) There is no other way for the outflow of the aqueous humor, either by the venous system or by the lymph spaces of the posterior part of the eye.

(*d*) The posterior lymph circulation is independent of the anterior one; it comprises that of the vitreous body and of the choroid.

(*e*) The lymph secreted from the posterior part of the ciliary process and the ciliary retina. It leaves the globe exclusively by the lymph sheaths surrounding the vessels of the optic nerve, and from there probably passes into the lymph vessels running side by side with the central and then the ophthalmic vein. It never reaches the anterior chamber or the perichoroidal space.

(*f*) The lymph secreted by the numerous choroidal vessels is collected in the perichoroidal space; this forms a blind sac ending forwards at the insertion of the ciliary muscle, backwards at the choroidal ring of the papilla.

The fluid is eliminated from this space by the lymph sheaths of the vorticous veins. These sheaths continue, probably around the veins outside of the sclerotic and become lymph vessels running side by side with the large veins; at any rate they do not empty into Tenon's space.

(*g*) The subconjunctival space and Tenon's space are independent of the lymph circulation of the eyeball.

(*h*) The lymphatic system of the orbit may be explained in the following way: The efferent veins of the eyeball (anterior ciliary veins, vorticous veins, central retinal vein) are surrounded by lymph sheaths where they leave the eyeball. These sheaths serve to empty the aqueous humor (around the anterior ciliary veins), the lymph of the vitreous body (around the central vein), and the lymph of the perichoroidal space (around the vorticous veins). These sheaths in the orbit continue on in the lymph vessels accompanying the veins and act as contributors or sources for the jugular lymph trunk.

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MEDICAL SOCIETIES

FORTY-NINTH MEETING OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY.

Held at Washington, D. C., May 6th and 7th, 1913.
Reported by Mrs. M. C. Repp.

The President, Dr. Myles Standish, in the Chair.

(*Concluded*)

Report of a Case of Cavernous Sinus Thrombosis Resulting from Small Abscess in the Skin of Temple. Vaccine Treatment.—Dr. Albert S. Snell, Rochester, N. Y.

The patient was an otherwise strong, healthy man of 24 years. For a day before his first visit the vision of the right eye had been rapidly growing dim and there was swelling of the lids. There was found to be œdema of the conjunctiva, exophthalmos, steamy cornea, slightly reacting pupils, and but little mobility of the eyeball. There was also œdema of the disc and tortuous veins. There was rapid pulse and low fever. There was a small crusted area on the right temple. The patient stated that there had been a pimple here and that he had pinched it a few days before. The condition was considered an orbital cellulitis. On the fourth day the condition had grown much worse. The lesion on the temple was then explored and the orbital cavity punctured. By the 7th day the condition of the patient was critical and anti-streptococcic serum was given. By the 17th day the patient had so far improved as to be almost normal and recovery seemed assured. On the 21st day the patient's condition became very serious and on the next day death took place.

DISCUSSION.

Dr. Emil Gruening, New York: Infective thrombosis of the sinuses is quite prominent in otological practice, but the otologists do not use serum. They remove the clot and they generally succeed in saving the patient. At the meeting of the International Otological Society last year Mr. Ballance, of London, read a paper on the operation of removing clots from the cavernous sinus. I think it would be of the greatest importance for ophthalmologists to study the matter of reaching the cavernous sinus and getting directly after the thrombus of the cavernous sinus.

Dr. F. H. Verhoeff, Boston: A year ago I performed an autopsy on a case that was an example of what such cases can be. It was a man who had a small furuncle inside of his nose and in a few days this extended up on the outside of his nose along the subcutaneous tissues into the orbit and produced a cellulitis, and in a few days he was dead. At autopsy he showed this cellulitis and thrombosis of the cavernous sinus and a meningitis. The organism here was the very common staphylococcus aureus.

Sarcoma of the Choroid, not Demonstrable by the Ordinary Transilluminator.—Dr. Allen Greenwood, Boston.

The patient was a young woman, with an acute fulminating glaucoma, which had been treated for 10 days by atropin ordered by her family physician. When first examined by the writer there was absolute glaucoma, no view of fundus, and only a slight light reflex. Absolutely no vision, so that the visual field could not be mapped out. No sign of trouble in the other eye. Suspecting a possible sarcoma, the transsilluminator was used, without demonstrating any tumor. An iridectomy was performed, and a week later the media had cleared sufficiently to give a view of the fundus. The optic disk could not be seen, as it was covered by a detachment of the retina. The eye was removed and showed a sarcoma close to and covering the optic nerve. This could be demonstrable only by placing the transilluminator as close as possible to the exit of the optic nerve.

Epibulbar Carcinoma, with Histological Examination of the Specimen.—Dr. G. E. de Schweinitz, Philadelphia, and Dr. T. A. Shumway, Philadelphia.

The case which we report was in a man aged 34, having a very large fungus-like, epibulbar growth which had begun about 14 years previously as a yellowish-white papule at the inner corneal margin of the left eye. During the last five years the growth covered the whole front of the eye and protruded between the lid. The eyeball was enucleated about 6 months ago at which time exploration of the orbit failed to reveal any suspicious tissue. About 3 months later the patient returned with a recurrence of the growth at which time a complete exenteration of the orbit was performed, and up to the present time there is no sign of recurrence. Microscopic examination of the growth shows it to be primary carcinoma of the conjunctiva. There was no perforation of the bulbus.

DISCUSSION.

Dr. Emil Gruening, New York: As I look back on my own experience in regard to epibulbar growths, I think they are to be dreaded. They all have recurrences. I think it is a mistake not to eviscerate at once. All the cases of epibulbar growth which I had and could follow, died; sarcomas and carcinomas both.

Dr. G. E. de Schweinitz, Philadelphia: I think, with Dr. Gruening, in most instances it is proper to enucleate and in this instance to eviscerate. I recall a patient who came to me 15 years ago in Philadelphia. She is perfectly healthy at the present time, but she probably would not have been a very loyal patient had I removed the eyeball on that occasion. On the other hand, Dr. Sweet and I had a case which died promptly. It is safer in most instances to take the eyeball out, as Dr. Gruening says.

Toxic Amblyopia Due to Tobacco Alone.—Dr. Matthias Lanckton Foster, New Rochelle, N. Y.

Adam says, in his Ophthalmologische Diagnostik, published in 1912, that it is doubtful if tobacco alone is competent to induce toxic amblyopia. To prove this competency on the part of tobacco a case of toxic amblyopia is reported, met with in a man 65 years old, who had been a total abstainer from intoxicating liquors for 40 years, who presented no symptoms of multiple sclerosis, or of any other organic disease of the central nervous system, and no signs of any form of poisoning except by tobacco, but had been an inveterate smoker for many years. The treatment consisted in total abstinence from tobacco with strychnine hypodermically, and by mouth over a period of 11 months at which time the vision was normal under proper correction, the final vision being 20/10— in one eye, with no central scotoma for red, and 20/15— in the other, with a minute central scotoma for red.

DISCUSSION.

Dr. Emil Gruening, New York: This is new to me. I have never seen a case of tobacco amblyopia. All the amblyopias that I see that concern the macula-papillary area are cases in which the subjects both smoked and drank to excess. I think that Milliken, of Constantinople, many years ago, stated that Mohammedans who smoked excessively, but did not drink, never have tobacco amblyopia. My Cuban friends also tell me that among Cubans who smoke a very strong tobacco which contains much nicotine this form of amblyopia is also unknown. This is in the line of my own observation. I could always make them confess that they did drink.

Dr. G. E. de Schweinitz, Philadelphia: There are cases on record in which it was believed that tobacco was the sole cause of toxic amblyopia. It is extremely difficult from a history of a patient to determine as to the patient's consumption of drugs and difficult to decide as to the patient's veracity. The interesting fact remains of a number of cases of tobacco amblyopia of women working in tobacco factories. In these cases the amblyopia disappeared when a change of occupation for the women was secured. Nevertheless it is extremely difficult in the vast majority of cases to eliminate the use of alcohol as well as that of tobacco. There is another thing to be taken into consideration. From the experimental standpoint it has been difficult to work with tobacco. There exists in certain horses in Australia a well known form of amblyopia. This depends in all probability upon their eating of the wild tobacco, which grows there.

A Case of Paralysis of Divergence.—Dr. William Zentmayer, Philadelphia.

The patient, a male, aged 33 years, was a barber. Diplopia came on suddenly about 1 year ago and has persisted. Troublesome at near work only. Characteristic diplopia. He was enabled to do his work by combining with the correcting lenses for a low compound hyperopic astigmatism, 8° prisms base out before each eye. Fundus and field were normal. There was a positive Wassermann and neurological examination revealed symptoms suggestive of a lesion in the left hemisphere. Under mercurials and potassium iodide the general condition improved, but no change in the ocular phænomena developed.

The Eye Examination a Help to Diagnosis of Commencing Arterio-sclerosis.—Dr. Edward R. Williams, Boston.

The object of this paper is to show how eye examinations may help in diagnosing commencing arteriosclerosis. In a series of 40 cases the diagnosis was made according to the classification of Alleman. In addition all were divided into three groups: (1) Where diagnosis of arteriosclerosis was made and the patient died from a cerebral hæmorrhage—9 cases. (2) Typical cases where a definite early diagnosis was made and later confirmed by repeated examinations—17 cases. (3) Suggestive cases, in which of 10 only 1 examination has been made or other data are lacking—14 cases.

Diagnosis may be either premonitory or confirmatory. The premonitory diagnosis has been always confirmed by subsequent fundus examinations, estimation of blood pressure, and general physical examination. The confirmatory diagnosis includes those suffering from chronic nephritis who seek relief for failing vision. The diagnosis of commencing arteriosclerosis is made if the following signs are more or less definitely seen in the fundus: (1) Tortuous terminal arteries, especially the arterial twigs close to the macula. (2) Depression of veins by sclerosed arteries, most easily seen close to the disk where the vessels are large. Comparing the crossing of sclerosed and normal arteries, it is often easy to see that the vein beneath the hardened artery is on a different level. There is often a slight bulging of the distal end of the vein. (3) The typical "silver-wire artery" was rarely seen among these patients. (4) Hyperæmia or "brick-red" color of disk, often with more or less blurring of its edge. In addition to these fundus changes there was noted a disturbance of the muscular balance in 9 cases, 34 per cent. of the patients in the first two groups. Heterophoria seems to be a functional disturbance, attributable to arteriosclerosis, which has not been mentioned by other observers.

Prognosis as to vision: In the first group of fatal cases, one-third became partially blind, the remainder had good vision till the end. Among the patients of the second group the variation of vision has been insignificant. As would be expected, practically all patients in the third group have normal vision.

DISCUSSION.

Dr. W. F. Mittendorf, New York: I have listened to the paper with a great deal of interest. It details cases which come early with degenerative changes which require the assistance not only of the ophthalmologist, but of the internist. As Dr. Williams pointed out, a great many of these cases are not aware of the marked decrease of vision and would go on in the ordinary routine of life until some serious change would take place. I have seen a great many of these cases and I have been very careful to have their arterial pressure measured. One of the first indications of these cases is to try to reduce arterial pressure. I would like to mention here that one of the greatest remedies in my experience has been the Russian oil of spermaceti. Taking a tablespoonful 3 times a day will reduce pressure from 235 to 175 or 185. Of course the great remedy in these cases is outdoor life. If you can get these patients to give up their business occupation, to go out and play golf, to row, or anything of that kind you will benefit them materially, especially in the group of cases where the depression of the veins by the arteries is very marked.

Dr. Allen Greenwood, Boston: One of the important symptoms is the fact that a slight disturbance in central vision is often the first symptom. The patient would complain in reading the test type line that the central letter is raised a little above the other. I think that is quite common in these cases of arteriosclerosis.

A Case of Thrombosis of the Retinal Vein, with Remarks.— Dr. J. Herbert Claiborne, New York.

The case described was in a maiden lady aged 44, in excellent general health, who consulted me because of a big "block" of smoke which appeared suddenly before the left eye after rising in the morning and which gradually grew less marked as the day advanced. The left optic disk was very red, the veins enlarged, small hæmorrhages between the disk and the macula. The next day the hæmorrhages were more marked and the veins were larger; the vision was blurred and there was a small scotoma. The urine was negative; blood pressure 124; Wassermann negative. A month later the condition appeared like choked disk. The patient was given potassium iodide in small doses and three months later had greatly improved. I believe that thrombosis of a vein presupposes a solution in the continuity of the intima thus affording a basis for the thrombus, and I infer that such was the condition in my case. This case seems to me to be unique on account of the good general health of the subject.

DISCUSSION.

Dr. Allen Greenwood, Boston: I think that a certain number of these cases of venous thrombosis are afterward, from a few months to a year and a half, apt to develop a glaucoma, uninfluenced by eserine or pilocarpin, which requires iridectomy for cure. I have had 3 cases in my practice of glaucoma following thrombosis of the central vein. The eye must then be removed as the ordinary treatment of glaucoma is unavailing.

Teaching Physiological Optics.—Dr. Walter B. Lancaster, Boston

Physiological optics is the most important subject the student of ophthalmology has to study, judged either by the amount of time he will spend in his private practice in work which is concerned with some part of that large field, or judged by the fact that it is physiological optics which is the distinguishing and characteristic feature of our special field—that part which is not found in any other branch of medicine and therefore will not be taught elsewhere, as are pathology, anatomy, general physiology, etc., which are taught all medical students.

At present no provision that I know of is made in this country for teaching that subject in the only way it can be adequately taught, viz., by a course of several hundred hours, largely laboratory work.

DISCUSSION.

Dr. Edward Jackson, Denver: In the University of Colorado for 2 years I have done what has seemed to me the most important work I could do for graduates in general medicine. For 2 years the class is divided into sections for demonstrative work and the demonstration work in ophthalmology has occupied 16 hours. I take two sections of 16 men each and see what the optical apparatus did to a pencil of rays and then let them use each others' eyes for practising, particularly with the ophthalmoscope. After explaining the method I stand over the men while they attempt to practice it, each student using another student's eyes to practice on. At first I have them look in without any mydriatic. Several got good views at the first lesson. At the next lesson I put a drop of cocaine into each eye and thus the pupil is sufficiently dilated to make a very favorable opportunity for the use of the ophthalmoscope.

Dr. B. Alexander Randall, Philadelphia: I agree with what Dr. Jackson has said. I would like to say that such instruction has been given in the University of Pennsylvania for a long while. In 1884 Harrison Allen asked me to take the Laboratory of Physiology for the autumn and give the course in physiological optics. In later years under de Schweinitz the teaching has been developed to a very notable extent. It is not, in our course, practical to give to physiological optics several hundred hours, but there are many hours given to it. The artificial eye is used, the methods of refraction are taught and a great deal more in that institution, at least, is put forth than in Dr. Lancaster's paper.

A Word More on Test-cards and Type.—Dr. B. Alexander Randall, Philadlephia.

The published cards are perhaps improving; yet flagrant offenses against the principles of their construction show that many are merely empirically based on Snellen's data, still less on the principle given us by Hooke and Helmholtz. Especially is this true of school-charts for illiterates. The difference between Paris feet and our English standards is ignored; the calculations, if made, are generally faulty, following Snellen in using the tangent of the angle of 5° instead of twice the tangent of half the angle; and the standard is stated to be constituted by strokes instead of interspaces subtending an angle of 1°. They are printed on glaring white cards, giving the utmost confusion by irradiation, when the execution is otherwise fair.

The following cases and instruments were exhibited:

Two Cases of Binocular Coloboma of the Optic Nerve in the Same Family.—Dr. George S. Crampton, Philadelphia, presented two patients with the following histories:

Case 1.—Man aged 20, with large coloboma of the nerve entrance of right eye, surrounded, except on the temporal side, by a coloboma of the choroid. The almost round scleral opening, 2½ times the diameter of a normal disc, is sharply undercut, and the vessels, faintly seen in the centre of the deep cavity, appear again about the edges of the pseudo-disc and pass out to the normal appearing retina. Refraction of fundus —6.00 D., of bottom of cup —18.00 D. He has poor perception of light only. Left eye is slightly myopic with corrected vision of 6/6. The scleral opening is transversely oval and somewhat larger than a normal disc. No coloboma of choroid. Cup undermined laterally but not so deep as in right eye.

Case 2.—Sister, aged 5 years. Right eye blind, left 6/12. Lateral nystagmus. Condition somewhat similar to the above but there is no coloboma of the choroid touching the disc. Both scleral openings are round and sharply cut with vessels distributed about the rim. Nystagmus prevented the measuring of the depth of the cavities. In the right eye some distance below the scleral opening, there is a sharply defined, round area of exposed sclera two-thirds the size of the disc, and elsewhere in the lower fundus a small irregular area of coloboma of the choroid. Three other members of the family were examined and found to be free from fundus defects.

Fatigue of Convergence, and its Varieties.—Dr. Lucien Howe, Buffalo, N. Y.

This paper is supplementary to my paper describing the ergograph before the American Medical Association in 1912. During the past year a considerable number of tracings have been made of normal as well as pathological eyes. Fatigue is the process of becoming fatigued, or tired, when a muscle is repeatedly contracted. We should use the word fatigued and not fatigue to express the condition of a muscle which has thus repeatedly contracted. When the fatigue of a muscle is traced by a pen on the revolving drum of an ergograph, the strength of each contraction is shown by the vertical excursion of the pen and the time is shown by the horizontal distance traced on the drum. It can be said without fear of exaggeration that the ophthalmic ergograph gives us promptly more accurate and complete data concerning the development of fatigue, especially the fatigue of convergence, than can be obtained in any other way.

Dr. Charles H. May, New York, presented the model of an ophthalmoscope which could be used either as an ordinary reflecting or as a self-luminous electric instrument. The mirror was interchangeable. This arrangement proved useful when, for any reason, such an exhaustion of the battery, burning out of the lamp or injury to the cords, the electric ophthalmoscope became useless at a time when the defective parts could not be replaced. Under such circumstances, the electric mirror could be removed and an ordinary tilting miror inserted; and the ophthalmoscope was then changed into one of the reflecting type.

Dr. S. Lewis Ziegler, Philadelphia, demonstrated a Nernst lamp and stated that the company had gotten out a very large model. They have perfected it and it gives a very beautiful illumination. You can illuminate the field of operation and the assistant can hold it in an easy way. It is adjustable. You can use it on either current. It gives normal values, such as you would have in sunlight. It is not so fragile as others.

Dr. Walter B. Lancaster, Boston, demonstrated on a rabbit, an instrument designed to introduce the transilluminator behind the eyeball so that one could transilluminate the eye near the posterior pole.

Dr. J. Herbert Claiborne, New York, demonstrated a new kind of cataract glasses, which were very light as to glass and frame. The glass weighed three-quarters of an ounce.

Dr. David Harrower showed a light to be used with the ophthalmoscope for illuminating. The battery can be bought anywhere for 75c., with the lamp for $1.25. Therefore it is a very cheap and simple lighting method.

Dr. J. Norman Risley announced that he had devised a table for use in the clinic room or office. The table gives ample room for everything that one may need, with a roller top covering all in.

Dr. F. H. Verhoeff exhibited an eye dropper bulb, which he said was as good a transilluminating mirror as any attachment. He also exhibited an attachment made out of two thermometer cases, with a disk of hard rubber for color scotomata. He found that the best transilluminator was made by putting an electric ophthalmoscope, the ones that pull out are most convenient, and put a piece of the eye-dropper over the end of that and it makes a perfect transilluminator.

Dr. R. L. Randolph showed two cases. Case 1. Presented a mass in the left eye lying a little below the equator of the eye. He thought it an inflammatory condition. Case 2. One of sympathetic ophthalmia. A boy injured in an explosion 2 years ago by a torpedo.

Dr. F. H. Verhoeff showed slides of Parinaud's conjunctivitis, demonstrating an organism which he believed was a leptothrix and the cause of the disease.

OFFICERS FOR ENSUING YEAR.

President, Dr. Robert Sattler, Cincinnati, O.

Vice-President, M. H. Post, St. Louis, Mo.

Corresponding Secretary, Dr. Arnold Knapp, New York.

Recording Secretary and Treasurer, Dr. William M. Sweet, Philadelphia.

Next meeting place, Hot Springs, Va., some time in May.

There were 95 members registered, the secretary considering it the largest attendance yet had at a meeting.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Annual Meeting.

The first meeting of this Society under the revised constitution was held on Thursday and Friday, April 24th and 25th, at the home of the Royal Society of Medicine and at the Royal London Ophthalmic Hospital, City Road, Mr. J. B. Lawford, occupying the chair.

Mr. Frank Juler read a communication entitled "Acute Purulent Keratitis in Exophthalmic Goitre, treated by repeated Tarsorrhaphy." The case was discussed by the President, Mr. Juler, senr., Mr. Coulter, Mr. Leslie Paton, Mr. Priestley Smith, Mr. Treacher Collins, Mr. Jessop, Mr. Bishop Harmon, Mr. Inglis Pollock, Mr. Johnson Taylor; and Mr. Frank Juler replied.

Mr. Ormond read a paper on two cases of permanent hemianopsia following migraine.

Dr. James Taylor and Dr. Gordon Holmes read papers on (*a*) "Conditions present in several members of a family with hereditary optic atrophy"; (*b*) "Unusual conditions associated with optic atrophy, of the family type." The first paper gave an account of two families showing a similar defect in vision. In the first family, D., the members of only one generation are affected. There are four brothers living, and two sisters; and of the four brothers, three are affected in a similar way, the fields showing the existence of a central scotoma for colors. The discs are pale. In the other members of the family there is nothing to suggest a similar defect. In the eldest of the three affected, the only other symptoms complained of are some weakness in the legs, and occasional difficulty in controlling the bladder. The reflexes are all normal. In the youngest brother, the visual symptoms are the only ones complained of. In the middle brother, besides the visual symptoms there is loss of knee jerk, and a sluggish reaction of the pupil to light, pains in the legs, and analgesia of the lower limbs—signs and symptoms of tabes dorsalis. In this patient also, there is a definite history of syphilis. In the second family, C., the affection of sight is similar, but it is spread over more than one generation. With pale optic discs in the members affected there is a central scotoma for white and for colors. In one member, optic neuritis was observed 8 years ago. In one family, four members are similarly affected, while a fifth has congenital cataract. In a collateral branch, three cousins have suffered, and a sister of these cousins had a large family, one of whom suffers from the trouble. Another died of an orbital tumor. Two other cousins, the sons of another sister, suffered from defective sight, apparently the result of defective development. The points emphasized in the paper are (1) the co-existence of family optic atrophy with tabes, yet the absence of any apparent effect of the tabes on the optic nerve in the cases affected. (2) The transmission of the optic atrophy in the female line, as shown by the family tree. (3) The occurrence of migraine in several of the patients affected, and its persistence even after practical blindness has been reached. (4) The occurrence of other eye defects in members of the family—congenital cataract in one, an orbital tumor in another, and defective eyes in two others.

At the Thursday afternoon session, Mr. Angus Macnab read a paper on an operation for the excision of the conjunctival sac and lid margins. The conjunctiva and lids are cleansed with hydrarg. perchlor. 1 in 2,000. If there be any discharge from the lacrimal sac, the ordinary operation for its excision should precede the treatment of the conjunctival sac. The lids are scrubbed with ether soap, and the disinfection completed by means of benzine. The rapidity and ease with which the operation is performed will greatly depend on the absence of bleeding, and the manner in which the primary incisions are planned will have a considerable influence on the hæmorrhage. A spatula is introduced into the sac, and the lids successively stretched over it as they are incised. He commences with the lower lid, entering the knife about 3 mm. from the lid-margin and opposite the junction of the inner quarter with the outer three-quarters of its extent, and cutting freely down on the tarsal plate the incision is carried parallel to the lid margin, to a point just beyond the external canthus; placing the spatula under the upper lid a similar incision is made which will meet the former at the external tarsal ligament. These incisions will pass down into the loose areolar tissue on the surface of the tarsal plates and into the orbit above and below the external tarsal ligament. A pair of narrow sharp pointed scissors is introduced with one blade above and the other below the external ligament and the incisions are joined, some care being observed not to notch the skin at the angle at the same time.

The next step will depend on the condition of the conjunctiva:

if it is thickened and glistening white so as to be readily visible, the edges of the lids can be seized with a vulsellum forceps and drawn inwards and forwards towards the nose, while the conjunctiva is separated from the orbital tissues below with a blunt-pointed scissors, until the mass only remains attached at the inner quarter of the lids which was not incised at the commencement of the operation.

If the conjunctiva be thin, redundant, folded and hyperæmic, as is often the case, it would almost certainly be buttonholed by such a procedure, and it is far better to introduce the left forefinger into the conjunctival sac and thus stretching the membrane, separate it from the orbital tissues with the scissors. In these cases there will always be a rather free venous oozing, but as the dissection can be carried out by touch this can be neglected until the sac is thrown inwards, when a pad wrung out of hot water will usually leave the wound dry. The original incisions are now completed by means of sharp-pointed scissors, one blade of which is passed under the skin, and the cuts made so that the lines of the first incisions are continued till they meet just beyond the internal canthus. The scissors are then rotated about a right angle, and the whole mass consisting of lid-margins, conjunctiva, and tarsal plates can be removed by a single cut. At this stage the angular vein will be divided and there will be a free hæmorrhage which can be easily controlled by forceps and ligatures. The wound is then closed by means of four sutures of fishing gut, which pick up the tissues at the bottom of the wound: the dressing is covered with a large pad of wool and a light pressure bandage. Healing almost invariably occurs by first intention, and there is only a thin scar to mark the site of the operation.

The operation can also be performed when the remains of a shrunken globe are present; in such cases the globe is pulled forwards and dissected out with the conjunctiva.

In cases where the whole globe is present and the operation is being performed originally instead of the ordinary excision, the incisions are made in the same way as before recorded, the lower lid is then pulled up and the dissection of the tarsal plates and the conjunctiva from the orbital tissues continued up to the attachment of the conjunctiva to the globe, when the capsule of Tenon is opened; the upper lid is then treated similarly, and the excision continued by dividing the muscles and the optic nerve as in the usual manner. The completion of the operation is by separating the mass at its inner half in the manner already indicated.

The majority of my patients have been asylum patients, but I have used the same operation in the case of a malignant growth at the external canthus, which was invading the conjunctiva and the cornea, and in which there was no recurrence one year after the operation. One of my patients had trachoma in both his empty sockets which contained the remains of shrunken globes; here the radical cure of the trachoma was achieved by the excision of both conjunctivæ.

I have been enormously impressed by the relief given to the patients who had discharging sockets by this operation, and have no hesitation in recommending it to those persons who go about with an empty socket covered with a shade especially as appearance too is greatly improved by the procedure here related, and as shown in the photographs.*

Mr. N. Bishop Harman read a paper entitled: "An Analysis of Three Hundred Cases of High Myopia in Children with a scheme for the grading of Fundus Changes in Myopia."

These cases were collected during educational work in London, and all belonged to the elementary schools, so were socially of the working classes. All had come under observation in connection with the new schools for myopes, many had been watched for several years. Out of the 300, boys were 46 per cent., girls 52 per cent., a difference of 6 per cent., which agrees with the difference in the sexes in ordinary vision tests. The bulk of the cases seen were aged 8 to 12 years. Cases in the earlier years were nearly all boys, which suggest a greater care by mothers for their men-children. The degree of myopia ranged from 4 to 25 D, the bulk, 64 per cent., were from 6 to 12 D. The extreme degrees were nearly all in girls. Hereditary influence was marked in 9 per cent. Astigmatism, which the author considered a most likely exciting or adjuvant cause of myopia, was present in 64 per cent., a far higher proportion than in other defects. Previous keratitis was found in 11 per cent. Congenital defects, such as albinism, coloboma uveæ, dislocated lenses, aniridia, existed in 5 per cent. Squint in 44 per cent. Nystagmus, mostly associated with bad vision, in 7 per cent. The lens had been removed by operation in 3 per cent. but the improvement of vision was not great.

Dealing with fundus conditions Mr. Harman criticized adversely their present nomenclature for changes about the disc; he proposed that the fundus should be spoken of as first, second or third degrees according as the atrophy at the disc was as wide as one half the disc diameter, the whole diameter, or greater than that. To this would be added other details about the macula, etc. He showed a chart giving the correlation of refraction and fundus change according to this plan, it bore out his contention. He maintained some definite notation was necessary when these cases came under observation for a definite object, such as the regulation of education.

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*Concerning this operation see: John Green, Am. Journal of Ophthalmology, June, 1884, also Adolf Alt, same Journal, March, 1903.—Editor.

Grave changes with lens changes, vitreous opacities, or detached retina, numbered 8 cases, or less than 3 per cent., of these 3 or 1 per cent. went blind, two of them probably by injury to their fragile eyes.

A chart was exhibited showing the changes in the myopia of 80 children who had received special education over several years; the number of stationary cases seemed to show that these arrangements were of value in the control of the condition.

The next communication was by Mr. Treacher Collins and Mr. Hudson, on the pathological examination of an eye with congenital anterior staphyloma. It was illustrated by a number of slides.

Mr. Treacher Collins followed with a paper dealing with fibrous tissue formation in connection with the fibro-vascular sheath and visible vessels on the surface of the iris.

The communication was discussed by Mr. Jessop, Professor Straub (Amsterdam), and Mr. G. Coats. Mr. Collins replied.

"The Sensory Pupil Reflex in Tobacco Amblyopia." Mr. E. Arthur Dorrell said that the dilatation of the pupil obtained when the skin of any part of the body was stimulated, was either in abeyance or obtained only by increased stimuli in tobacco amblyopia.

One hundred cases were examined by him. The lowest stimuli which gave dilatation in the normal eye were obtained from 5 to 7 cells of a constant current battery, 5 cells of which gave approximately 3.5 milliampères, the negative electrode being applied to the side of the neck.

The cases were divided into three classes as follows:

Class A.—Ordinary unselected cases, showing no signs of nervous disease and not suspected of tobacco poisoning.

Class B.—Cases suspected of tobacco poisoning and showing no signs of nervous disease.

Class C.—Cases showing signs of nervous disease.

In Class A, 58 eyes were examined with the result that in 89 per cent. only 5 to 7 cells were required to produce the reflex.

In Class B, 121 eyes were examined and in only 20 per cent. was dilatation obtained with 5 to 7 cells, and in over 50 per cent. of the remaining 80 per cent. no dilatation was obtained at all, with the strongest stimulus the patient could stand.

In Class C, 18 eyes were examined and in only 22 per cent. was the reflex obtained with 5 to 7 cells and over 75 per cent. of the remainder gave no dilatation.

Owing to the similarity in the results in Classes B and C this test was not a positive sign in favor of tobacco poisoning alone, but should be included in the symptom complex of locomotor ataxia and allied affections of the spinal cord.

Friday morning was occupied with the discussion of the subject "Vascular and other Retinal Changes in association with General Disease."

Dr. James Taylor opened the discussion by referring to the wide scope of the subject and said he thought it would be impossible to discuss it fully in a manner which would be instructive. So he proposed to direct particular attention to thrombosis or embolism of retinal vessels and to raise some points in reference to other conditions embraced in the title of the discussion.

Dr. Taylor asked first as to the prognosis in albuminuric cases and referred to the short duration of certain cases and the length of life in others. He mentioned a case of albuminuric retinitis which he observed during five years before death occurred. He referred also to diabetic cases and mentioned a case in which the condition had existed during eight years, the patient being still alive. The condition of "silver wire" arteries described by Marcus Gunn was also alluded to, and a case, seen by Gunn and diagnosed by him, was mentioned, as being still alive after nine years. Dr. Taylor then referred to four cases with the ophthalmoscopic appearance of embolism of the central artery of the retina. In two of these heart changes were present; in two no such changes existed and there was no albuminuria. Reference was made to the frequent occurrence of the characteristic ophthalmoscopic appearance of embolism of the central artery in which no heart disease could be discovered. Such were probably thrombotic.

Eight cases of venous thrombosis were then described. In 7 albuminuria with a hypertrophied heart was present; in several both conditions; one is alive and in fair health after two years.

A brief reference was made to retinal hæmorrhage resulting from syphilitic disease—not a very common condition.

Dr. Taylor concluded by expressing the opinion gained from the experience which his colleagues at Moorfields had afforded him, that in most cases of venous thrombosis, cardiac hypertrophy and vascular disease are usually present. Albuminuria also may be present. In his experience venous thrombosis is not very common in glycosuric cases. The prognosis in such cases is bad, yet, exceptionally, the duration of life after venous thrombosis is much longer than one would naturally expect, and reference was made to a case seen by Mr. Morton six years ago with venous thrombosis who is still alive and well with good vision.

Mr. L. Werner (Dublin) dealt with the subject angio-sclerosis, chiefly from the clinical and ophthalmoscopic points of view. The ophthalmoscopic evidences of the disease were first considered and discussed. The necessity of an ophthalmoscopic examination in cases of suspected angio-sclerosis in general practice was emphasized and some cases were related illustrating several points of interest.

Obstruction of the retinal circulation was next treated of in connection with two cases, illustrative of different type of the disease.

The first was one of embolism of the inferior temporal branch of the central artery, occurring in a gentleman aged about 48. The upper nasal quadrant of the field of vision was suddenly lost. A white plug was seen in the affected branch of the artery, which was almost empty below it, the central vision, however, was never impaired and was still normal 15 months later. A few days after the attack, medical examination revealed the presence of a mitral valvular lesion.

Mr. Werner's second case was an unusual one of obstruction of retinal circulation in both eyes in a boy aged 11. The left eye became suddenly blind while he was at his lessons and three days afterwards the sight of the right eye went in a similar way. The ophthalmoscopic signs were those of blocking of the central artery, with breaking up of the blood column in the vessels. In the second stage the left optic disc became swollen to such a degree as to resemble a choked disc and, in both eyes, white stars of exudation developed at the macula. Perception of light was absent in the right eye for 12 days and in the left for 4, nevertheless vision improved to 6/36 in the former and to 6/24 in the latter.

The diagnosis was discussed and strong evidence brought forward to show that the disease in this case was tubercular in origin.

In conclusion the interesting subject of sudden temporary obscuration of sight was referred to. The ophthalmoscopic appearance observed during the attacks were summed up, and the cause discussed including the theory of arterial spasm.

Mr. George Coats described first the normal structure of the central artery and vein, and pointed out that in passing through the lamina cribrosa the elastic membrane of the artery breaks up into a feltwork of fine fibrils, while in the case of the vein elastic tissue disappears entirely from the wall. The normal central vein is little more than an endothelium-lined space in the tissues.

Disease of the central artery takes the form of a deposition on the inner aspect of the elastic membrane, of a new tissue composed in varying proportions of cells and fibrils, which encroach on the lumen, usually in an eccentric manner. The elastic membrane itself is often thickened, and elastic fibres are an important constituent of the new tissue. Both the cells and fibrils tend to undergo degeneration; the cells become swollen and fatty, the fibers indistinct and hyalin. Finally, by breaking down, debris-filled cavities may be formed. These changes are always greatest in outer layers of the new-formed tissue.

The primary lesion is probably a proliferation of the endothelium; in the normal central artery of a young person no other tissue is visible within the elastic membrane. The elastic tissue is probably a derivative of these proliferated cells, the case being analogous to the laying down of new layers of the membrane of Descemet by the endothelium of the anterior chamber.

Evidence of primary disease of the central vein is very rare even in cases of obstruction of that vessel. Thickening and infiltration of the wall occur, but not usually at the site of obstruction; they are therefore probably secondary, not primary and the cause of the block.

In the retinal vessels the commonest form of disease, at least in cases of obstruction of the central vein, is a thickening of the fibrous tissue of the wall. This is the same condition as is found in the central vein, but it differs from the commonest type of disease in the central artery, the change affecting the intima in the central, the media in the retinal, arteries. Endothelial proliferation is also found, but more rarely.

It is not improbable that endothelial proliferation is a response to the stimulus of a circulating toxine, fibrosis a strengthening of the vessel wall to resist increased bloodpressure. Hence the frequency of fibrosis in the retinal vessels, which are badly supported and liable, when glaucoma is present, to be nipped at the edge of the cup.

It is probable also that endothelial proliferation is represented in the ophthalmoscopic picture by irregularities of calibre without much apparent change in the vessel wall, while fibrosis, by increasing the reflection from the wall, causes brightening of the reflex (silver wire arteries), and in more advanced stages, white lines along the vessels.

Mr. Coats also demonstrated the pathological features of some cases of obstruction of the central vein and showed that in early stages a homogeneous thrombus might be found, which subsequently undergoes invasion and organism from the surrounding connective tissues, or sometimes from the endothelium. Probably the primary cause of most of these cases is interference with the circulation due to arterio-sclerosis. Cases occur, however, in which there seems to be a true inflammatory affection of the vein wall, and this accounts for some of the instances in which young persons are attacked.

Two cases were also demonstrated which proved that not all cases of arterial obstruction are due to endarteriitis and thrombosis, but that the condition may be due to embolism.

The discussion was continued by Mr. Priestly Smith, Professor Straub, Mr. Bishop Harman, Mr. Richardson Cross (Bristol), Dr. Leighton Davies, Dr. Gray Clegg (Manchester), Mr. Whitehead (Leeds), Dr. Gordon Holmes; and the openers replied.

In the afternoon an extensive series of cases were exhibited and discussed at the Royal London Ophthalmic Hospital. During the Congress the members dined together.

OPHTHALMIC SECTION

OF THE ST. LOUIS MEDICAL SOCIETY.

Meeting of April 2, 1913.

Pictures of Malignant Syphilis, with Demonstration of an Adaptor for taking Stereoscopic Pictures.—By Dr. W. H. Luedde.

The patient here presented, who has just passed through an interstitial keratitis involving both eyes, was under treatment at the same time that the case of malignant syphilis was under my observation. The contrast in the course of the disease in the two individuals was striking.

They were both young adult males, white, one aged 23, the other 26 years. The case that ended fatally showed much better physical development. Even the case record made at his admission to the City Hospital one month before his death describes his general condition as "well nourished." This statement is not entirely accurate as he went to the hospital after he had been wasting away gradually for six months previously.

The man, here present, in contrast, shows stunted growth, marked kypho-scoliosis and was the victim of a chronic psoas abscess, several years ago. No suspicion of lues existed in the mind of the family physician, but the diagnosis of tuberculosis confirmed by a von Pirquet test, in addition to the other findings when the corneal involvement first appeared in the right eye, seemed to cover everything. In this feeble individual the Wassermann test was very positive, where in the well nourished man it was feebly positive in the early stage and negative just before the fatal result. This adds another instance to the general experience showing the unreliability of the Wassermann test as a measure for the severity of lues in a given case.

In both cases the clinical diagnosis of lues was satisfactorily established. In the one syphilis was clearly a hereditary disease; in the other it may have been acquired, though no facts relating to the infection nor early symptoms could be elicited. All physical signs were lacking.

The detailed clinical history cannot be repeated in this short abstract. The fatal case first came under Dr. H. E. Miller's observation on account of a nasal sinus disease with some external swelling apparently connected with the frontal sinus. An external operation by Drs. Miller and Schlueter showed unusually extensive necrosis, making operative relief hopeless. Vigorous specific treatment (Hg. and K.I.) which had been begun by Dr. Miller was continued. Examination of tissue sections showed "chronic inflammation." Cultures showed staphylococci, a finding taken to be of little importance in chronic processes. Increased swelling of the eyelids with subsequent sloughing brought the case under my observation. Salvarsan injections both before and after his admission to the City Hospital did not stay the progressive destruction of the tissues, bony as well as superficial. He began to show marked weakness and died at the City Hospital scarcely 8 months after the beginning of the attack. Shortly before death the Wassermann test was negative. If this can be taken as a credit to the treatment, it remains a fact that the patient died.

In the other case, while the patient had recovered with scarcely a trace remaining of his attack and has gained in weight, etc., the Wassermann test, at present, is positive, as at first after the same general treatment including one injection of salvarsan. These stereoscopic pictures of the fatal case were made with a pair of specially designed spectacle "fronts" added in front of an inexpensive Brownie Stero-kodak. This is an idea which is demonstrated here for the first time. It has practical value because it enables one to get pictures which portray special clinical processes in a more lifelike manner than ordinary photographs without the expensive apparatus hitherto required. The "fronts" consist of a pair of prisms with bases combined with convex spherical lenses of any desired strength according to the size of image desired on the films. Any oculist can make them up from his trial case by using a frame with an open cell as here shown, or, they can be ground to order by the optician. Incidentally this demonstrates the value of trial lenses with special rings referred to at the last meeting of the Section. The other stereoscopic photographs are from interesting specimens in Dr. D. L. Harris's collection at the Snodgrass Laboratory.

DISCUSSION.

Dr. R. Schlueter: This was an exceptionally interesting case to us, who were compelled to see it off and on during the several months and will probably never be forgotten, because many a time we held a consultation to figure as to what we could do for him, but at every step our efforts were utterly futile. In the description of the original condition, I have a somewhat different impression than Dr. Luedde. I do not want to say mine is more correct, but he saw the case at a time after we had mutilated him. When I first saw him he had nothing externally over the region of the frontal sinus. The history which I received from Dr. Miller, when first called to his office, was that the patient had come with an inflammatory condition in his nose, extending up towards the orifices of the frontal sinus. To relieve this frontal condition, Dr. Miller had taken off a piece of the anterior portion of the middle turbinate. The bone, which he removed, as well as the soft tissue, showed necrosis. Microscopical report: Chronic inflammatory tissue. Now, before I saw him a swelling had occurred externally just below the right lower eyelid, involving the inner third. It was small at first, very small, the necrosis on the inside of his nose had extended somewhat, to what extent I could not see because we could only feel the bone. Between the skin and bone there was an area which showed that the soft tissues had loosened up from the bone. On the swelling there was a small sinus. In this we could also feel denuded bone. After cutting down and enlarging that opening in his lower lid and continuing it upward and inward as far as we could see necrosed bone, we found that bone attached very firmly. So there was no need in the face of this suppurating condition to do anything more after we found out the extent of the trouble. The necrotic soft parts were removed from the nasal surface. The nasal process of the superior maxilla was entirely denuded. A clinical diagnosis of syphilis was first made by exclusion. No other condition which we could imagine, could produce such kind of destruction. We gave him anti-syphilitic treatment and had a Wassermann reaction made. The process continued. I did not see much of him but I think there was very little change in this condition except that it steadily progressed. The process did not respect any bone sutures. These seemed to offer no impediment.

Dr. Loeb: I would like to suggest the use of dionin in the first case if it has not been used. And secondly, I would like to know if any attempt had been made to demonstrate the spirochæte pallida in the wound of the other case?

Dr. Higbee: I have tried dionin in corneal opacities with very indifferent success. A short time ago I had a case in which a corneal opacity appeared outside the line of injury and found that by massaging the cornea it seemed to clear up. Since then I have used massage without local medication in several cases of keratitis and have had some very gratifying results. These cases were under internal medication which no doubt had considerably to do with the absorption of the opacities, yet I think the massage had something to do with the result, owing to the fact that they improved much faster than under treatment I had used before on similar cases.

Dr. Post: I would like to say that years ago I tried massage pretty thoroughly in haziness of the cornea, and I never saw any good result from it. I used salves with it, but was disappointed with the result of my efforts to make the cornea clearer.

Dr. Luedde, in closing: No attempt was made to demonstrate the spirochæte pallida. As Dr. Schlueter has said, antisyphilitic treatment was given him on the clinical diagnosis of syphilis. The feeble Wassermann reaction was obtained before I saw him. We tried every available means to check the necrotic process, but our efforts, as well as those made at the City Hospital, were wasted.

In answer to Dr. Loeb's suggestion, I would say that I used dionin many years ago, watched it carefully and compared it with other cases in which it was not used. I failed to see any real advantage in dionin in cases of this kind. I know that some observers have made claims for it, but we all know that some corneal infiltrations and scars clear up much better than others. When we get good results we are likely to give credit to the method used. If we fail, we take that case to be an exception to our favorite method. The rapidity with which this case has cleared up would have added to the reputation of dionin had it been used. As it was not used, it shows how much can be done without it.

(*To be Concluded in September Number.*)

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
St. Louis, Mo.

SALVARSAN IN OPHTHALMOLOGY.

Garcia del Mazo (*Revista de Medicina y Cirurgia Practicas,* Deç. 21, 1912) says that recent studies show that as soon as syphilis is generalized throughout the organism all the tissues are invaded by the treponema, being found principally in the lymphatic spaces, through which it reaches the brain and spinal cord, producing meningitis, myelitis, etc. The cerebrospinal fluid is greatly altered and as the optic nerve, the common ocular motor, the external ocular motor, and the acoustic and facial nerves are found in the base of the skull bathed in this fluid, it is natural to suppose this is the cause of the nerve disturbances. The ocular accidents must be considered as neurorecurrences, as the clinical characters do not look at all like those observed when atoxyl and arsacetin are administered, which, from the beginning are of atrophic type. A fact which shows that there are a number of ocular disturbances due to salvarsan is that we see a great number of patients with paralysis of the eye muscles and ocular disorders which are not very frequent in the first period of syphilis when only mercury is employed. The pathogenic symptoms of ocular disorders are very obscure and there are several hypotheses to explain them: 1. The slight toxic action of salvarsan upon cranial nerves shows a locus minoris resistentiæ and fixing consecutive of the syphilitic virus; 2, the treponema is hastily expelled from the cutaneous mucous tissues to the nerve centres; 3, a great number of endotoxines, which cause complications, remain free when salvarsan is used; 4, the ocular disturbances are complications of a latent disease in which salvarsan has no influence. Many authors also believe in the influence of the idiosyncrasy upon anaphylaxis, upon hypoalkalization, upon the reaction of Herscheimer, in an excess or defect of the administration of the drugs or in a fault of technic. The author reports the results of a series of cases and finishes by saying that salvarsan does not sterilize the organism; that it does not seem to be dangerous to the healthy eye, and that the results obtained in the treatment of ocular syphilis are not better than those obtained with mercury; therefore "606" must be used only when mercury is not tolerated, and a rapid action is needed.—*N. Y. Med. Jour.*

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ORIGINAL ARTICLES.

CASE OF CATARACT RESULTING FROM LIGHTNING STROKE.

By L. R. Culbertson, M.D.,
ZANESVILLE, OHIO.

Mrs. G. G. H., aged 21, was referred to me by Dr. J. H. Wright, August 13, 1909.

Stated that while telephoning to Dr. Wright, about seven weeks previously, lightning struck the phone and knocked her down, becoming unconscious a short time. On recovering consciousness, her left eye was greatly inflamed. Her family physician treated it for a while.

When she first consulted me, I found intense irido-cyclitis in the left eye. V. each eye about 5/5; Tn in both. Is pregnant three months—about five weeks at time of stroke.

I prescribed atropia, dionin and hot fomentations. Her physician carried out the treatment. She returned to me March 23, 1910, blind in the left eye from soft cataract and nearly blind in the right eye from cataract. Urine was normal. Is nursing her baby. It is interesting to note that her baby's left ear is smaller than its right ear. Whether this is due to the effect of the shock on the mother, or whether a coincidence, I cannot say.

On October 23, 1912, at the Good Samaritan Hospital I did a combined linear extraction on L.E. She was then nursing another baby.

In December, 1912, I fitted her for glasses L.E.V. Rem. was +9. sp.⊃+3.5 cy. 95=3/7.5. Prox. +14. sp.⊃ +3.5 cy. 95=1.25/.30 Sn.

TRANSLATIONS.

ON THE EPISCLERITIC PROCESS AND ITS SEQUELÆ.*

By Dr. H. Pagenstecher,
WIESBADEN, GERMANY.

Translated by Adolf Alt, M.D.

It is a well-known fact that various affections of the eye are cured or favorably influenced by the use of the Wiesbaden hot springs. First among these are the affections of the iris due to a rheumatic or gouty diathesis, of the mucous membranes and of the muscular apparatus. Aside from these affections on account of which yearly many patients seek and find a cure here, there is another eye affection which, too, is in certain stages favorably influenced by the Wiesbaden waters; I mean the chronic episcleritis.

It does not seem unimportant to point this out in a few lines, since this eye affection is one of the most refractory and leads to serious consequences, and since our usual treatment in this disease has hitherto sometimes failed us altogether. In such cases we must not overlook any remedy which may aid a cure.

It is not easy to give a concise description of the episcleritic process, since we have to deal with a many-sided affection of the eye, and since its different stages may resemble each other so little that one might hardly believe that the same disease could be their basis.

Usually the affection develops from very slight, insidious inflammatory symptoms which appear in the sclerotic generally, at first near the cornea, sometimes nearer the æquator bulbi. When the slight injection of the conjunctiva bulbi lies near the cornea it is possible to mistake it for a purely pustulous affection. In such cases the action of the 2½ per cent. or 5 per cent. yellow oxide of mercury ointment will quickly clear the diagnosis, since the purely pustulous affections will usually heal in a few days under the influence of this remedy. When the episcleritic process appears more peripherally, that is in the parts of the sclerotic which are closer to the æquator, it is mostly characterized by a sector-shaped deep injection of the bulbar conjunctiva, often with a slight swelling. This is best seen when the patient turns the eyeball to the side opposite to the diseased part and when at the same time the lids are drawn away from the eyeball. Such parts are as a rule painful on pressure, and that is what leads the patient to the oculist. At this stage the affection may spontaneously disappear; in other cases large doses of aspirin and moist applications may often aid in an astonishing manner. Yet, it would be foolish to expect that in this way the disease is cured once and for all time. The disposition is present in the body and it may again and again after months, even years, reappear, often without known cause, sometimes after taking a cold. If the first attack does not yield to aspirin, and if the process is not energetically dealt with, the injection of the conjunctiva increases, a thickening of the sclerotic becomes plainly visible, on which hump-like, thick nodules may develop, which are sometimes very painful on pressure; sometimes, however, cause no sensation whatever. At this stage the affection may remain stationary for a long time without any impairment of the function of the eye. It may, also, disappear spontaneously, and return again. When the thickening of the sclerotic had been present for a continued period, a dark discoloration of the sclerotic results, which remains behind. This symptom often aids in making a correct diagnosis in the later stages of the affection, when the episcleritic process itself is more in the background and the sequelæ become apparent. If the disease progresses, primarily the cornea becomes affected, and usually by a parenchymatous opacity which starts from the corneal margin. Such an opacity, which not infrequently grows into the central parts of the cornea, causes visual disturbances of varying degree. Sometimes these opacities are of an evanescent character; that is, they may disappear comparatively quickly and reappear at the next attack at another or even the same place. In most cases, however, when the opacities had reached a high degree, even after the total extinction of the process, dense parenchymatous corneal opacities remain behind, which seem to submit to no treatment and are stationary.

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*From the Aerztliche Festschrift zur Eroeffuung des Staedtischen Kaiser Friedrich Bades in Wiesbaden, 1913.

In the further stages of the disease the iris, also, may be affected. An exudative iritis is set up with posterior synechiæ of a very torpid nature. It is very rare in this form of iritis to see deposits on Descemet's membrane. After a prolonged iritis the lens may become affected, either through exudative deposits on the anterior lens capsule or through opacities in the anterior corticalis and at the æquator, which in time may lead to cataract formation. When in later stages of the disease the pathological symptoms in the sclerotic appear together with corneal opacities and the inflammatory alterations in the iris, the picture resembles exactly that of a beginning scleral staphyloma. If in such cases the intraocular tension is increased, it may happen that really a true scleral staphyloma results.

As a rule, the process remains confined to the anterior part of the bulbus. Exudations into the vitreous body are relatively rare.

This process may drag along for years and decades with shorter or longer relatively free intervals, if it cannot be brought under control through proper treatment. During the whole course of the affection variations of the intraocular pressure are very frequently observed. Rarely do they reach such a degree that an antiphlogistic operation is called for. More frequently we find during the course of it a pronounced hypotonus which may sometimes reach such a degree that the refraction is materially altered.

The affection is hardly ever found in juvenile individuals. Cases in persons under 25 years are extremely rare. It is observed most frequently between the twenty-fifth and the fortieth years.

As ætiological factors, colds, rheumatic and gouty diatheses are mentioned the oftenest. According to my observations there are undoubtedly cases which are due to these causes; but it seems to me that congenital lues is the most frequent cause. The typical chronic episcleritis is, as a rule, a late symptom of congenital lues. Acquired lues may bring about a gummatous affection of the sclerotic in its anterior parts and this may look exactly like an episcleritis with formation of nodules, yet in its character and course it is an absolutely different affection.

It seems that examinations of the blood, especially the Wassermann's test, have as yet not been made in these cases. I have had no occasion thus far to make such examinations, but I intend to study this question more thoroughly in the future. My observations are based solely on ætiological researches where they were possible.

The treatment of episcleritis is shaped primarily according to the causal affections, and secondarily according to the stage at which the case is seen. In lighter cases, which are problably on a rheumatic basis, aspirin with moist hot application is usually very effective, and we see such cases not infrequently cured by this therapy with astonishing rapidity. Especially in such light cases, particularly if other rheumatic symptoms coexist, the Wiesbaden thermal baths have a very beneficial influence, so that in some cases the affection is healed for ever. Unfortunately, however, such cases are rare. As a rule, the episcleritic process returns sooner or later, often after colds, riding against the cold wind, oftener, however, without any known cause. If during such relapses a thickening of the sclerotic with yellowish nodules takes place, usually all the antirheumatic and antigouty remedies fail us. In such cases the use of iodine preparations, potassium or sodium iodide, given internally in large doses are in place. Sometimes these remedies exert a really miraculous effect, especially when the formation of nodules in the sclerotic has reached a high degree. When the affection has reached a further stage, and the cornea shows a parenchymatous opacity and the iris a chronic inflammatory process, frequently enough even this medication is without effect and we are forced to employ continued energetic mercurial inunctions and diaphoresis. I should like to lay especial emphasis on the cotemporaneous diaphoresis in combination with the inunctions, since I have found that with this method in these processes we obtain our aim incomparably quicker than by employing one of these agents alone or even one after the other. This treatment is enhanced in its effect by hot electric applications and mydriasis, especially when the intraocular tension is below the norm. In a few of such cases I have made an observation which I must not omit. It concerned cases of severest episcleritis with great nodule formation, secondary affection of the cornea and usually of the iris, also. The patients had taken iodides even in large doses without success; I therefore ceased the iodides and ordered an inunction cure with diaphoresis. Against my expectations, this, too remained useless and showed but a slight effect on the disease process. When, however, at the end of the inunction and diaphoresis cure I returned to large doses of iodides the result was an astonishingly good one. It seems, therefore, that there are cases which must be rendered susceptible to the beneficent influence of the iodides by a previous inunction and sweat-cure. In order to be effective finally the iodide preparations must in many cases be continued for a long time, for many months. They are best given internally when they are well borne. If that cannot be done we have a good supplement in the 10 per cent. or 20 per cent. iothion ointment. This is usually well borne and can be used for a long time.

When the episcleritic process has run its course and, as is usually the case, more or less dense parenchymatous opacities have been formed in the cornea, which impair vision to a marked degree, an optical iridectomy may have to be considered. We must, however, be very circumspect in this question, because in these cases the success as to the improvement of vision quite frequently does not come up to our expectations. It may, also, happen that a year later the part of the cornea in front of the coloboma is opaque and the remainder of the cornea has become clearer, for these opacities are often very variable. It is wise not to proceed to an operation until after repeated inunction- and sweat-cures, and after a prolonged observation has led to the conviction that the inflammatory process has absolutely come to an end. Under those conditions we note in many cases very good results concerning vision, especially when the lens has remained perfectly clear, although the pupillary area is filled with a dense membrane. If, however, the lens is opaque, also, we must, when the cataract formation has reached a certain degree, add the extraction of the lens, which usually promises a good prognosis, since even after an existence of years this process does not lead to opacities in the vitreous, and retina and optic nerve remain intact.

As stated above, the effect of the Wiesbaden thermal waters—as a bathing or drinking cure—is extremely favorable, together with antirheumatic and antigouty remedies, in slight degrees of episcleritis. In the severe cases which are accompanied by more or less nodule formation, and the other conditions detailed above, inunction- and sweat-cures and the use of large doses of iodides must in the main be relied on. A specific action of the Wiesbaden thermal waters is out of question. Yet, I believe myself to have become convinced that in such cases, too, the use of a bathing or drinking cure at this place, when following an inunction cure or between two such cures, may influence the course of the disease favorably.

SCLERITIS AND PODAGRA.*

BY DR. D. W. P. KALASCHNIKOW.

Translated by Adolf Alt, M.D.

Experiences made during the last years concerning the affection of the sclerotic induce me to remind oculists of the opinion of Th. Panas who from its construction compared the eye with enarthroses, like the hip joint, where the eye would represent the caput femoris, and Tenon's capsule the trochlea.

This anatomico-physiological analogy in my opinion enables us to explain the ætiology as well as the methods of treatment of diseases of the sclerotic, which in its structure represents a tendinous tissue and may be looked upon as a part of the "eye-joint."

In fact the sclerotic is subject to the same diseases as are the joints and, according to my experience, demands the same treatment as these. Like a joint, the sclerotic is most frequently attacked by the so-called rheumatic affections. Syphilis and tuberculosis affect it much more rarely. Acute articular rheumatism, a disease *sui generis*, an infectious disease, causes in the eye inflammation of Tenon's capsule (according to Panas, a hydrarthrosis oculi) and is accompanied by an increase in temperature; chronic articular rheumatism, which at present is and by right generally viewed as an arthritis urica, in the eye causes scleritis (scleritis urica).

We oculists must join the surgeons and do away with the name "chronic rheumatic affections," since such a general affection of the whole organism does not exist and such a designation in the vast majority of the cases simply serves as a useful cover behind which the physician hides when he is unable to make a clear diagnosis. It is therefore not permissible to speak of rheumatic scleritis (as due to such a systemic disease), since the largest number of such cases take their origin from the same podagra, which at first and most frequently attacks the joints as well as the sclerotic.

In affections of the sclerotic we must, therefore, above everything treat the podagra. The long drawn out course of these affections, their obstinacy towards our treatment, our helplessness, which is so disconsolately spoken of in both old and recent text-books, are accounted for by the fact that the true cause of the disease, the podagra, is not thought of and not properly treated. All sorts of remedies have been used including general mercurial inunctions, and this without sufficient indications, while as most trustworthy remedies for the treatment of scleritis. above all, the anti-podagric ones should be considered, like piperazin, atophan, urodonal, urosin, etc., of course in conjunction with mineral waters, baths and diet.

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*Centrlbl. f. pr. Augenhlk., July, 1913.

In analogy between the joint and its tendinous parts, the sclerotic, demands also the same local treatment. With great irritation, as in exacerbations of the process, the same permanent warm wrappings, rest and immobilization as of the joint are required. When the inflammatory process recedes the same massage comes into place, just as with joint affections, first with bland ointments, then with more and more irritating ones; finally with ichthyol, mercurial and iodine ointments (pure iodine). Further it is necessary to ease the circulation of the blood and the circulation of the products of metabolism in the lymph channels between the avascular cornea, the almost avascular sclerotic, and the anterior chamber through Schlemm's canal. This cannot be done with atropin, which, aside from increasing the intraocular pressure and thus constricting the diseased tissues, compresses Schlemm's canal itself and plugs it with iris. Here, on the contrary, eserin and pilocarpin are demanded.

In all of my observations I have used eserin or pilocarpin in the shape of ointments instead of atropin, the employment of which is justified only by the danger of synechiæ and which has generally been applied without benefit. The miotics act by reducing the intraocular pressure, by aiding the circulation in Schlemm's canal, and by increasing the absorbing surface of the iris, which in this disease is of the greatest inmportance and must necessarily help to a quicker and better absorption and elimination of the inflammatory products.

I believe even to be permitted to state, that scleritis is so often due to podagra that it may be looked upon as one of the symptoms of podagra which might serve the internists for diagnostic purposes in difficult cases, in which the analysis of the urine fails to give sufficient data for the confirmation of the "podagric state" of the patient. We must point out that severe cases of podagric scleritis go hand in hand with severe forms of general podagra. In consequence such cases demand treatment cotemporaneously from the oculist and the internist, just like diseases of the heart and kidneys demand the observation and treatment of a specialist.

Finally, I think I must say that in all cases I have observed, even the severest ones, such a joint-treatment was perfectly successful.

OPTIC MENINGITIS IN RECENT SYPHILIS.*

By Dr. F. De Lapersonne,
PARIS.

Translated by Adolf Alt, M.D.

Among the ocular manifestations of syphilis optic neuritis without extension into the retina and choroid has been the object of numerous and interesting studies. May it suffice to mention the beautiful researches of Professor Uhthoff (1900) in which among 253 cases of neuritis of infectious origin he found 51 due to acquired and 10 to hereditary syphilis. Dufour and Gonin in their article in the *Encyclopédie Française d'Ophtalmologie* divide these neuritis cases into early and late ones.

The early optic neuritis appears very soon after the primary lesion. Groenouw has seen it six weeks after the healing of the chancre; Soemiskiewitch between the first and fifth month. In the observations which I have made and in which the primary lesion could be definitely determined the neuritis appeared in the third, fifth and seventh month.

It is frequently one-sided in character and may be accompanied by the other mucous or cutaneous lesions of the so-called secondary period. The clinical picture shows nothing specially characteristic and the ophthalmoscopic picture does not suffice to make a diagnosis. Among thirty cases of neuritis in which syphilis had been acknowledged, Smith saw fourteen of papillitis, seventeen of neuroretinitis and three of retrobulbar neuritis.

In the cases which I have observed there was particularly an œdematous neuritis and once a papillitis. I have not observed the stage of light hyperæmia of the papilla in recent syphilis, as has been described by others.

This neuritis may heal completely without leaving a trace appreciable, even with the ophthalmoscope; most frequently the picture of a postneuritic atrophy remains behind with a white papilla with irregular margin, pigment deposits and broad veins, and the functional disturbance seems to be without relation to the lesions seen with the ophthalmoscope.

In order to explain the early appearance of these lesions, their different clinical aspects and their varying prognosis, it is certain that the idea of a parenchymatous or interstitial neuritis is no longer satisfactory; another explanation is now more and more accepted, that of an optic meningitis. The sheaths of the optic nerve, especially the arachnoid, are primarily affected and the cellular infiltration by means of the pia mater penetrates into the interfascicular spaces of the optic nerve the fibres of which are secondarily altered.

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*Arch. d'Ophtalm., August, 1913.

Several years ago Pierre Marie and Léri have tried to prove that all syphilitic lesions ending in atrophy of the papilla and blindness, especially in the course of tabes, are due to a chronic meningitis of the optic nerve. Bourdice in an excellent thesis has studied optic meningitis in a great many cases of acute and chronic infections and especially in syphilis.

This idea is beginning to become general in neurology. Vincent maintains that no syphilitic neuritis develops without meningitis, whether in tabes or general paralysis, or meningomyelitis, whether it produces the Argyll Robertson pupil, ocular paresis or transitory hemiplegia.

As regards the visual apparatus, the proof is furnished by the lymphocytosis of the cerebro-spinal fluid. In 1903, more than ten years ago, I have, as one of the first, I believe, shown "that lymphocytosis is present in the development of syphilitic affections of the retina and optic nerve and that it disappears in the retrogressive period"; and Professor Widal, in view of my communication, stated that the lymphocytosis is the more intense the more recent the cutaneous or ocular lesions. The importance attached to the cytology of the cerebrospinal fluid in ocular syphilis is now well known; it is no longer simply interesting on account of the great proposition of polynuclear cells in comparison with the lymphocytes.

Although there was rarely an occasion to furnish the anatomical proofs, they have been given us in Uhthoff's paper. He notes in one case "a very intense inflammatory process characterized by the swelling of the pia mater sheath, by newformation of bloodvessels and a great cellular infiltration"; and in another "the formation of intervaginal exudates and the production of a symphysis with fibrous formation which almost totally compressed the central vein." Does not the anatomical process found in optic meningitis, instead of being secondary, precede the lesions of the nerve?

The optic meningitis being admitted, it is easily comprehended that in descending neuritis it does not affect the whole nerve from the canalis opticus to the entrance into the eyeball to the same degree. These differences in localization explain the variety of clinical symptoms, as retrobulbar neuritis, œdematous neuritis or papillitis. They explain also the possibility of a favorable prognosis as we can employ energetic treatment from the beginning of the arachnoido-pia mater inflammation, when the cellular infiltration has not penetrated deeply into the nerve and the interstitial exudations have not yet had time to alter the optic nerve fibres. It is therefore necessary that, although the functional disturbance may attract little attention, the diagnosis is made as quickly as possible by means of the ophthalmoscopic signs and by the Wassermann test made with the blood and with the cerebrospinal fluid. Then an energetic treatment can be instituted.

In a general way my method of treating cases of ocular syphilis is the following:

(1) *Weak treatment.*—In cases in the retrogressive stage, tabetic atrophies, chorioretinitis and old iridochoroiditis I make intramuscular injections in the place of choice above the linea trochanteria of sublimate oil, consisting of 10 centigrammes of bichloride of mercury and 10 grammes of sterile olive oil, put up in ampules containing one cubic centimeter. The injections are made every second day in a series of twenty to thirty.

When intramuscular injections are not possible for various reasons, I order inunctions of four grammes of Neapolitan ointment, watching with the greatest care the condition of the gums and giving at the same time iodine preparations. I have absolutely abandoned the use of mercury pills or solutions.

(2) *Intensive treatment.*—In most cases of ocular and cerebral syphilis I give intravenous injections of cyanide of mercury in series of twelve to fifteen every other day, using 10 centigrammes of mercuric cyanide in sterile water 10 grammes, put up in ampules of a cubic centimeter. This series is followed by intravenous injections of salvarsan when the kidneys are found to be healthy. We employ twenty-five to thirty-five centigrammes of salvarsan, or from thirty to forty centigrammes of neosalvarsan, in twenty cubic centimetres of sterile water, freshly prepared. Three or four intravenous injections are made in intervals of a week; then we begin again with a series of twelve intravenous injections of cyanide of mercury.

(3) If, however, the action must be even more rapid, as in the cases of very early optic meningitis, it is better to begin with the salvarsan injections. We make three or four injections of the strength above mentioned with weekly intervals. The arsenobenzol acts very rapidly in cutaneous eruptions, in iritis and in

certain forms of cyclo-iridic gummata. But at once after this we begin a series of twelve intravenous injections of cyanide of mercury, for I am convinced that only the association of the two remedies gives us rapid and lasting results.

OBITUARY.

DR. D. W. GREENE, 1951 to 1913.

Dr. Duff W. Greene died suddenly at Dayton, Ohio, on August 17th. Born in 1851, he was only 62 years old. His unexpected demise is a sad loss to American Ophthalmology. For many years at the head of the Eye Department of the National Military Home and St. Elizabeth's Hospital at Dayton, he had made a name for himself as a successful practitioner, an energetic worker and skillful operator, when the Smith cataract extraction method exerted a special fascination on him. Having performed this operation on numerous patients, he finally went to India and remained several months with Major Smith, observing his cases and operating under his personal direction. After his return he was the chief exponent of this method by word and deed in the United States.

Personally Dr. Greene was a most lovable character, always friendly and cheerful, full of the keenest interest in everything pertaining not only to Ophthalmology but to Medicine in general; a man whom it was a pleasure to know and a source of pride to be able to call friend. He, also, is one of our Immortals.

ALT.

Dr. Casey Wood has been appointed Professor of Ophthalmology and Head of the Department of Ophthalmology in the newly organized College of Medicine of the University of Illinois, the reorganized and former College of Physicians and Surgeons, Chicago.

MEDICAL SOCIETIES

OPHTHALMIC SECTION

OF THE ST. LOUIS MEDICAL SOCIETY.

Meeting of April 2, 1913.
[*Continued*]

A Case of Foreign Body in the Eyeball.—By Dr. E. H. Higbee.

There are times when even an oculist is in a quandary as to just what to do for a patient, and the following case clearly demonstrates this fact. I think a paper could be written upon this case entitled, "The Oculist's Dilemma," as you will see by the history.

The physician, in referring the patient to me, said, "I cannot diagnose his trouble as the result of an injury." When I first saw him I found some swelling of the lids, marked injection of the conjunctiva and sclera, and a complete synechia of the iris. Tension was minus; there was no marked tenderness on palpation of the globe; he did not complain of much pain, but this point is indefinite, he being a Greek and understanding very little English. I learned from him that he had been struck with a piece of hot rivet in the eye, about one month previous, and had been treated by a physician who seemed to think that his trouble was a specific one, as near as I could determine, evidently though he did not use atropine. I had an x-ray picture taken of the eye and this shows a foreign body 5 mm. below the horizontal plane, 5 mm. to the temporal side of the vertical plane and 4 mm. back of the center of the cornea. I advised him first to have the eye removed for the situation of the foreign body seems to show that it lies in the ciliary region. He refused to have the eye removed. Next I advised him to let me try to remove the foreign body. This he also refused to let me do. As near as I can determine, he has rich relations in Athens, who have advised him to have nothing done over here, but to come home and have the eye attended there.

Now my hands are tied, so to speak. I know what this man should have done, yet he refuses. I also feel that if he had had proper care in the start he might probably have been able to retain his eyeball (a very important factor with most people). Yet, I cannot do anything to eliminate faulty early treatment.

I expect to send a letter with him, to his oculist in Athens. Will he deliver the letter? Will the Athens physician believe what I tell him? So I say this is at least one of the oculist's dilemmas. To-day he told me he was hurt January 12th and he came to me February 3rd.

DISCUSSION.

Dr. Shahan: I can recall a case similar to this in a boy 8 or 10 years of age. While he was playing with a tenpenny nail on the end of an elastic band, the nail got loose, flew back and struck him in the eye. The anterior chamber was filled with blood so that at first I could not gauge the extent of the injury. I thought probably an iridodialysis had occurred with hæmorrhage into the anterior chamber. I watched the eye from day to day and about the second or third day the blood cleared away very rapidly so that vision came up quite decidedly. About the fourth or fifth day the hæmorrhage was all gone except a small clot in the lower nasal quadrant. Following this, vision came up to normal. When the clot disappeared, a small cilium was found to have occupied the center of the anterior chamber. I observed the cilium for several months. It is still there, apparently doing no harm whatever.

I recall another patient who came from a clinic in considerable terror, having been advised there that his eye must be removed. He had been struck on the sclera by a piece of steel which had cut to the choroid but had not penetrated the globe.

His vision was very low, but under ordinary treatment the inflammation rapidly subsided, the hæmorrhage cleared away from the anterior chamber, his vision became about 20/30 and remained there.

Dr. Post: I would like to ask Dr. Higbee if he took any precaution so that this patient will not sue him for damages later on? Damage suits are now very rare, though at one time they were frequent. I recall a case where the advice was not taken to remove an eye; later, the other eye was lost and the doctor whose advice was ignored was sued for damages three times. I always feel that where I give advice to remove an eye and the patient rejects it, that I must take some special precaution to protect myself in case later on the patient should think it a good plan to try to get "some of the doctor's money".

Dr. Shoemaker: In connection with the injury of the cornea in this case of Dr. Higbee's, I would like to report a case, interesting because of the marked change in the refraction following the injury. A case of a boy about 8 years of age who had been wearing a plus 0.5 D.s. prescribed by a competent oculist. He was playing with some other boys and had filled a bottle with water, corked it up and put it in a fire and watched developments. The thing exploded and a piece of glass struck him in the eye, producing a cut through the temporal half of the cornea and into the ciliary region. There was some prolapse of the iris but no iridectomy was done. It healed up very nicely with slight disfigurement of the pupil. There is not much astigmatism. He accepts no cylinder but does accept a plus 8. D. spherical which gives him 18/24+ vision. I cannot account for the change of refraction unless it is due to a change in the position of the lens.

Dr. F. Parker: In regard to Dr. Post's remarks on malpractice, I will say I had a patient referred from out of the city to me, suffering as he thought from a cold or conjunctivitis. Upon examination with x-ray, I found a foreign body in his eye and advised removal. It was objected to very seriously, and I was also threatened with a malpractice suit, which, had I not had the picture to prove my assertions, most likely would have occurred.

Dr. Higbee, in closing: In answer to Dr. Post, I have taken no special precaution in this case. These fellows have an interpreter, who is a very intelligent fellow, who explains to them that they are being properly cared for, and as a rule keeps them out of the hands of the lawyers, especially that class of lawyers that make blackmail their specialty. I think the x-ray picture combined with what I have told the man, also the testimony of those who have seen him, would be sufficient to convince a jury that I had told him the truth, and had also done all that could have been done under existing circumstances.

Anterior Scleral Trephining in Glaucoma.—By Dr. J. Ellis Jennings.

Since the introduction by Von Graefe of iridectomy as a cure for glaucoma, it has been the means of saving countless thousands of eyes from blindness. The experience of years, however, has taught us that while iridectomy insures a permanent cure in inflammatory glaucoma, it is of little or no value in about 50 per cent. of cases of chronic or simple glaucoma. Nevertheless iridectomy is the operation of choice even in simple glaucoma, with the chances of success greater if the operation is undertaken in the early stages of the disease. When iridectomy fails to permanently reduce increased tension, other measures for its relief must be resorted to. First in importance is sclerotomy, introduced by De Wecker as a substitute for iridectomy on the assumption that the section in the sclera was of greater importance than the excision of the iris. He considered the significance of the scleral incision to lie in the fact that by means of it a cicatrix was introduced into the sclera, which allowed fluid to filter through it. It is now thought that the value of this operation is due to the deep incision cutting through the root of the iris, thus opening up drainage through the spaces of Fontana and the canal of Schlemm.

One of the newer operations for the relief of glaucoma which really does cause the formation of a cystoid scar, is trephining the sclera as advocated by Fergus and Elliott. In the 1911 year book Fergus says the operation has so far given entire satisfaction, but defers any attempt to estimate its value until he has had larger experience with it. Elliott has done 128 operations, the bulk of them under cocain anæsthesia, usually combined with adrenalin. In six operations some vitreous was lost; in five cases the trephine failed to enter the anterior chamber and a small curette had to be used. In sixty-five of the one hundred and twenty-eight operations the trephining was followed by removal of a portion of the iris; in fifty-seven a small peripheral iridectomy, and in the other eight a large complete iridectomy. In his later cases iridectomy has been less frequently demanded. Seventeen cases were examined after intervals of from thirty-seven days to one year. In all but one of them the filtration continued free and good. In this one it was doubtful but the tension remained normal. The technique of the operation is as follows: The first step is to make a large triangular flap of conjunctiva, beginning 10 mm. above the limbus and having it 7 mm. wide. The flap is dissected down to the corneal margin with scissors and then by careful dissection with the blunt pointed knife the flap is carried still further until the dark crescent of the sclero-corneal junction is seen. In this way the outermost layers of the cornea are separated a short distance continuously with the conjunctival flap. The flap is now turned down upon the cornea, and the trephine is started as far forward on the cornea as the flap will admit (at least ½ mm.), being careful in turning the trephine to keep it at right angles to the eyeball. The tendency of all operators is to cut through first on the side nearest to them. As soon as the sclera is cut through the aqueous wells up and often with it a bulging of the iris into the wound occurs; this is cut off, making a limbal iridectomy. The tag of sclera is removed with fine forceps and care must be taken not to let this tag fall or be pushed into the anterior chamber as has happened in a number of cases. The flap is now replaced and retained by one or two sutures.

My experience with this operation is limited to two cases: Case 1.—Mr. C. B., age 67, was first seen by me in September, 1912, giving a history of repeated attacks of pain for several years. When I saw him the eyeball was red and painful, the anterior chamber very shallow, the pupil about 4 mm. in diameter; the lens opaque and the T plus 2 with no perception of light. Eserin, first in weak solution, and then in stronger, up to 1 per cent. were used without effect in contracting the pupil or in reducing the tension. As in my experience little or no benefit is to be derived from iridectomy when eserin does not contract the pupil I decided to trephine the sclera. The operation was done November 14, 1912. With the removal of the tag of sclera there was a gush of aqueous, but no prolapse of iris. I then replaced the flap and secured with two sutures. Three months after the operation the patient returned for examination. There had been no return of pain and the tension was normal.

Case 2.—Mrs. J. G., age 54, consulted me September 26, 1912, on account of defective sight of the right eye. V. R. 15/100; L. 5/4. A fundus examination of the right eye showed detachment of the retina above, below and to the temporal side. She was kept in bed for two weeks with the eyes tightly bandaged, but as this treatment had no effect on the detachment she went home. March 10, 1913, she returned with a history of severe neuralgic pain in and about the right eye of five days' standing. The eyeball was intensely injected, the cornea steamy, the anterior chamber almost obliterated, the pupil semi-dilated, the lens opaque, no light perception and the tension plus 2. As in case number 1 eserin failed to contract the pupil or reduce tension. I trephined the sclera on March 14th. After the tag of sclera was removed I was surprised at not seeing a gush of aqueous and a reduction of tension. So I introduced the delicate forceps into the anterior chamber and tried to draw out a portion of the iris, but it was evidently glued fast and would not come. I then made pressure on the globes until a large bead of vitreous welled up into the wound, when the tension was reduced to normal. The conjunctival flap was secured in its normal position and when I examined the patient sixteen days later the tension still remained normal and the patient was free from pain.

DISCUSSION.

Dr. Charles: When the literature on trephining first appeared, it appealed to me because of my experience with a case which I reported to this section in 1909 of "Scleritis with Perforation and Formation of a Conjunctival Cyst." A negro woman was admitted to the Female Hospital, giving a history of rheumatic pains and ocular discomforts for a long time. There had also been present a lump above and to the inner side of the cornea. The eye exhibited a hypopyon ulcer, iritis, ciliary tenderness (V= digits at one foot), a large subconjunctival "cyst" upper and inner quadrant. Pupil excluded. After dilatation with atropia the subconjunctival fluid disappeared, leaving visible a large round hole in the sclera over the ciliary region which was fully 3 mm. in diameter and so clean-cut as to look as if the sclera had been trephined. When the nurses forgot the atropia and the pupil again closed, the "cyst" reformed. The case convinced me that since it was possible to maintain an open communication between the interior of the eye and the subconjunctiva, the plan was feasible to establish drainage at the filtration angle.

Dr. Loeb: I would like to ask the doctor if he remembers the condition of the retina in that last case, whether it was still detached?

Dr. Luedde: I have a set of Meyrowitz trephines. They have a small handle to be used for regulation of the pressure and lessening the tendency to cut through unequally. I think this operation may be helpful. It would be more accurate for purposes of record and comparison to have taken the tension in these cases with a standard tonometer. The old method of indicating tension as normal, plus 2, etc., is so much a matter of personal interpretation that it lacks scientific accuracy.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

Clinical Meeting, Wednesday, May 7, 1913.

Sir Anderson Critchett, Bt., C.V.O., President, in the Chair.

Mr. N. Bishop Harman showed a case of exenteration of the orbit with partial excision of the maxilla and ethmoid for rodent ulcer. The woman had first seen the rodent seventeen years ago, and she treated it herself with caustics. It frequently recurred, and nine years later was as large as a farthing. She then had x-rays at every recurrence for four years. Next, zinc ions were used; followed by radium for nine months. When sent to him for operation, the ulcer was as large as a penny and was fixed to the bone. Ultimately, an extensive operation had to be performed, for the growth was found to have extended into the orbit and the bony walls. Mr. Harman said none of the newer measures for the treatment of rodent ulcer could compare with the knife for certainty and security, and the knife was infinitely less costly than any other method. Had this growth been excised in the first instance, the woman would have escaped the necessity for this severe operation, and would have preserved to herself two sound eyes.

Mr. Harman also showed drawings of a case of extreme hyperphoria, for which he had operated by his new method of subconjunctival reefing. The patient, a woman aged 28, had been a martyr to severe headaches since school days, and could obtain no relief from them. Examination of the eyes revealed hyperphoria, or latent vertical squint, requiring a 15 degree prism to correct. It was impractical to wear such a high degree prism. Concluding from other signs in the case that the left superior rectus was at fault, he operated, shortening that tendon by his new method. She had now orthophoria to every test, and the headaches had completely ceased. Seven months had elapsed since the operation, and the result was perfect in every way.

Mr. Edgar Chatterton showed a case of tubercular iritis in both eyes. The boy noticed that his sight was bad when at school thirteen months ago. He had never had pain, and there was no history of tubercle or syphilis. Two months ago he had yellow vascular nodules in both irides, at the angle of the anterior chamber, posterior synechiæ, keratitis punctata, and vitreous opacities. He was now having tuberculin injections, 1/1000 of a mg. once a week, and frequent tappings of the aqueous. The condition had improved on that treatment.

Mr. Sydney Stephenson showed a case of ocular torticollis in a boy aged 13½. At three months of age, when recovering from whooping cough, he held his head towards the left shoulder, and that habit had persisted. While he was in the wry-neck posture there was no squint nor diplopia. But when he straightened his head the right eye turned upwards and outwards, and vertical and contortional diplopia developed.

Mr. G. H. Pooley and Mr. Harold Grimsdale showed cases of angioma of retina, and Mr. Pooley also exhibited a case of giant-celled sarcoma, in which there had been several operations for recurrences, the last in November, 1911, since which there had been no further appearance of the disease. The President commented on the present procedures as a great advance on the days of removal followed by the application of caustic zinc paste to the remaining surface of the wound.

Mr. H. Herbert showed a case of third nerve paralysis with rhythmic clonic spasm. In this case no divergence was to be seen, but there was the same absence of strabismus as in congenital paralysis of the sixth nerve. The synchronous raising of the lid to the normal extent was due to spasm of the unstriped levator muscle, which was innervated by the sympathetic.

Mr. H. J. Fisher exhibited a case showing arterio-venous communication in the cavernous sinus, successfully treated by ligature of the common carotid. Mr. Elmore Brewerton, discussing the case, pointed out the reason why the internal carotid should be tied in preference to the common carotid, and said he thought that measure would be followed by more cures, and less cerebral complications.

Mr. Ernest Clarke presented a case showing an unusual arrangement of opaque nerve fibres. The patient was a myopic youth aged 20. There was a peculiar ring round the disc, bulging forward, giving to the disc a crater-like appearance. Opaque nerve fibres spread from all parts, and partly involved the macula.

Mr. R. Cruise showed three instances of trephining combined with insertion of thread in glaucoma, the object of this being to increase the area after trephining. The aqueous filtered along the course of the thread, and did not cause inconvenience. He explained that the procedure was on its trial. The President said one of the cases shown he sent to Mr. Cruise for treatment, expecting that enucleation would have to be performed, but from a tension of +3 the tension was now reduced to normal or even subnormal, and the pain had gone.

Mr. Richardson Cross (Bristol) showed a pigmented growth of the conjunctiva. The general impression was that free excision followed by the galvano-cautery to the residue should be done.

The Ordinary Meeting of the Section was held on Wednesday, June 4, under the presidency of Sir Anderson Critchett, Bart., C.V.O.

Mr. Cole Marshall showed a case of uncommon type of cataract in a child. Mr. Bishop Harmon brought forward a case of melanotic growth, which seemed to originate in the iris. Mr. Jessop inclined to the view that it sprang from the ciliary body, and pushed the iris on one side, causing flattening of the edge of the pupil. He agreed that it was a melanotic sarcoma. Mr. Treacher Collins mentioned a case of melanoma of the iris, malignant characters having arisen later. He agreed with Mr. Jessop that in the present case the origin of the growth was probably the ciliary body. A possibility in Mr. Harman's case was that it was a cyst, such as Mr. Coats described, with agglutination of the ciliary processes.

Mr. Bishop Harman also showed a case of spontaneous recovery from detachment of the retina. The patient had had complete detachment for three months, and during it she was in bed three times; she refused operation. Shortly after that date the sight suddenly came back, and now there was no trace of any detachment; all that could be seen were one or two cobwebby lines in the disc. She had 6/36 one-letter vision. She had 10 D of myopia, but there had been no accident of any kind. She was a cook in a good family, and one February night she walked out from a hot room to the cold air, and her description was that something black suddenly fell over her eye, and she could not see anything more with it.

Mr. Goudie described the case of a child which came to the Glasgow Eye Infirmary with detached retina, and in whom three months later the retina became re-attached. Two months afterwards it again became detached, only to again become attached. There was fair vision, and no iritis.

Mr. Rayner Batten said he had a case with nearly 20 degrees of myopia and detachment. Detachment occurred also in the other eye, and the patient was so blind for a year or two that she had to be led about. Later she came and said she saw a glimmer of light, and from that date her sight began to return; she accepted her lenses again, and was able to find her way about. He believed her vision was 6/24.

Mr. Herbert Parsons said he, like others, was sceptical about spontaneous recovery from detachment being possible, until he had a case which altered his view. It occurred in hospital, and though a little later the patient was very carefully examined, no trace of the detachment could be detected, not even streaks to mark what had occurred. Eighteen months later, however, he came with a relapse.

Mr. Macnab described a case of double detachment which underwent spontaneous cure. In another case in which the condition occurred there had been irido-cyclitis, and he believed it was due to tubercle of the eye; there was a large vitreous opacity, and very extensive detachment; the eye was very soft, being practically devoid of tension; the cornea could be seen to be dull and crinkled. Vision was reduced to mere perception of light. He gave tuberculin, and a vaccine cultivated from the patient's own coli bacilli. For four months now the tension had been normal, and the patient could count fingers at five or six metres.

Mr. Jessop reminded the meeting that when the Ophthalmological Society discussed the subject, only one case was reported as having been cured, and that was spoken to by Mr. Nettleship and Sir John Tweedy. Many cases of cure of the condition had been reported, but they had not been lasting.

Mr. Ormond did not share Mr. Jessop's scepticism, and described a case of his own, in a patient who had been treated by glasses for high myopia, and a little later she said her vision suddenly went in one eye. She had obvious detachment of the outer side of the retina. He did a sclero-puncture, and removed some fluid, and in three days the detachment had disappeared. He had seen her a number of times since, and the detachment remained absolute. Vision was 6/36.

Mr. Leslie Paton reminded the meeting that Mr. Harman's case was one of spontaneous re-attachment, not after operation. He was more optimistic than Mr. Jessop on the subject. He had seen a case of thirty-five years' standing cured after operation, though it was a double case. In another case, that of a lady with 15D of myopia, and vision 6/18 in either eye, there was detachment in one eye, resulting in blindness, and that was followed by detachment in the other eye. After operation her vision was better than before the detachment. In the case of a girl with detachment, she was put on her back and treated with mercury and iodide, and in three months the retina had become re-attached, leaving only a curious distribution of retinal pigment. In a series of twenty-eight cases of detachment which he had looked up, seven were cured.

Mr. Nettleship and Mr. Jessop suggested that in the near future a further discussion on the subject should be held by the Section. Mr. Nettleship said he had records in his case-books of several cases of detachment which had recovered.

Mr. Cunningham showed a case of nystagmus with uniocular fixation.

Professor Worthington, F.R.S., gave a contribution and demonstration on "An experimental study of normal monocular polyopia."

Mr. G. H. Pooley read notes of a case of cyst of the iris.

Mr. Goudie described a case of corneal ulceration, the discharge from which contained fusiform bacilli and spirilla resembling those found in Vincent's angina.

Dr. Freeland Fergus presented a communication entitled "Glaucoma associated with venous congestion."

Mr. Bishop Harman submitted a paper on the education of high myopes, the experience of four years. It was an account of the working of a scheme for the safe education of children with such a degree of myopia that they were not fit for the ordinary school curriculum, yet were not bad enough to require the teaching for the blind. In any scheme of compulsory education, there must be provision for misfits, and for none was this more necessary than for high myopes, who often had great intelligence and hence were in danger of damaging their delicate eyes by over-application. He explained the method of selection of cases and their transfer to centres for special instruction. The curriculum fell into three parts: (1) oral, the children being associated with scholars of the ordinary school for subjects which could be taught orally. (2) Literary work, which was learned not by books, pens, or paper, but by blackboard and chalk, the writing to be done free-arm fashion. (3) A full use of the handicrafts which would develop attention and concentration with a minimum use of the eyes. His conclusion was that a suitable system of teaching myopes could be arranged and satisfactorily carried out. Such classes should not be independent units, nor be associated with existing blind-schools, but should be integral parts of existing elementary schools. Their success depended almost wholly on the intelligence and initiative of the teachers, who were required to do real teaching. The training of these children should be general, not merely technical. The classes should be of small size, with an optimum number of a dozen per teacher, and there should be a standard of visual acuity of 6/18 with suitable glasses. The children should also be under regular medical supervision during the whole of their school life.

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY.

Preliminary Announcement of the Eighteenth Annual Meeting.

Hotel Patten, Chattanooga, Tennessee, Monday, Tuesday and Wednesday, October 27, 28, 29, 1913.

Headquarters and Meetings will be held at Hotel Patten, Chattanooga, Tenn. Hotel reservation may be made through the Secretary, or from Hotel Patten.

Officers.—Dr. John W. Murphy, President, Cincinnati, Ohio; Dr. J. O. McReynolds, First Vice-President, Dallas, Texas; Dr. Perry Goldsmith, Second Vice-President, Toronto, Canada; Dr. J. E. Brown, Third Vice-President, Columbus, Ohio; Dr. Secord H. Large, Treasurer, Cleveland, Ohio; Dr. Lee Masten Francis, Secretary, Buffalo, N. Y.

OPHTHALMOLOGY.

Lieut.-Col. R. H. Elliott, Madras, India—"Oration in Ophthalmology."

Dr. Harry S. Gradle, Chicago, Ill.—"Some Anomalies of the Retinal Pigment Epithelium," being a posthumous paper by Dr. H. Gradle.

Dr. George Keiper, Lafayette, Ind.—"A Further Contribution on Parinaud's Conjunctivitis with Report of Two New Cases."

Dr. C. F. Adams, Trenton, N. J.—"Adenoids as a Factor in Amblyopia."

Dr. C. C. Stuart, Cleveland, Ohio—"Case Report of a Peculiar Lesion of the Retina of the Eye."

Dr. John Green, Jr., St. Louis, Mo.—"Retraction Movements of the Eye; Acquired and Congenital."

Dr. Wendell Reber, Philadelphia, Pa.—"The Elliott Trephining Operation for Glaucoma."

Dr. David Crawford, Guthrie Center, Ia.—"Bi-focals: Who Should Wear Them and Essentials of Success in Fitting."

Dr. J. M. Patton, Omaha, Neb.—"Ocular Symptoms Associated with Oxycephalus or Tower-Skull."

Dr. Nils Remmen, Chicago, Ill.—"Twenty Sclerotomies for Glaucoma."

Dr. F. P. Calhoun, Atlanta, Ga.—"Bilateral Coloboma of the Lens, Complicated with Senile Cataract Operation."

Dr. C. D. Wescott, Chicago, Ill.—A Case of Granuloma of the Lid with Specimen.

Dr. Walter Lancaster, Boston, Mass.—"Truths and Errors about the Effects on the Eyes of Working with Artificial Illumination."

Dr. Allen Greenwood, Boston, Mass.—"Evisceration, Glass or Gold Ball Implantation. A Plea for its More General Adoption."

Dr. Robert Scott Lamb, Washington, D. C.—"The Use of Pilocarpin and Eserin in the Diseases of the Eye."

Dr. Will Walter, Chicago, Ill.—"Some Scientific Aspects of Inoculation Therapy."

Dr. F. Park Lewis, Buffalo, N. Y.—"Psychic Disturbances Involving the Eye."

Dr. Percy Fridenberg, New York City—"The Conjunctival Flap in Ophthalmic Surgery. A New Procedure."

Dr. S. Lewis Ziegler, Philadelphia, Pa.—"Operative Technic of Ophthalmic Surgery."

Dr. C. B. Wylie, Morgantown, W. Va.—"Physiologic and Pathologic Relations of the Eye and Accessory Sinuses of the Nose."

Dr. G. Sterling Ryerson, Toronto, Canada—Subject to be announced.

Dr. E. C. Ellett, Memphis, Tenn.—Subject to be announced.

EAR.

Dr. George R. West, Chattanooga, Tenn.—Oration—"Pelvic Reflexes."

Symposium of the Mastoid; "Recent Advances in Surgery of the Mastoid."

Dr. Gerhard H. Cocks, New York City—"Indications for Operation in Acute Mastoiditis, with Special Reference to Radiography and Bacterial Findings." (By invitation.)

Dr. R. Johnson Held, New York City—"Discussion of Methods of Treating the Wound Cavity to Procure the Best Results."

Dr. J. Clarence Sharp, New York City—"When is the Performance of the Radical Mastoid Operation Imperatively Indicated?" (By invitation.)

Dr. Carl Fisher, Rochester, Minn.—"Epitheliomata of the External Ear."

Drs. Jos. C. Beck, Dr. Wm. L. Ballenger and Dr. J. R. Fletcher, Chicago, Ill.—"Symposium on Labyrinth."

Dr. E. R. Lewis, Dubuque, Iowa—"Physiology of Vestibulation."

NOSE.

Dr. Perry Reaves, Greensboro, N. C.—"Nasal Surgery with New Instruments."

Dr. Wolfe Freudenthal, New York City—"Further Observations and Experiences with Suspension Laryngoscopy."

Dr. Seymour Oppenheimer, New York City—"Accessory Nasal Sinuses in Children."

Dr. J. A. Stuckey, Lexington, Ky.—"Sinus Diseases."

Dr. Emil Mayer, New York City—"Nasal Dysmenorrhea."

Dr. Myron Metzenbaum, Cleveland, Ohio—"Exenteration of Middle Turbinates for the Radical Cure of Empyema of Frontal Sinus, 35 Cases, Illustrated by Lantern."

Dr. Kate Baldwin, Philadelphia, Pa.—"The Violet Ray in Throat, Nose and Ear Conditions."

Dr. Sidney Yankauer, New York City—"A Demonstration on the Manikin and on the Cadaver, of the Intra-nasal Operation on the Lachrymal Apparatus."

Dr. W. E. Sauer, St. Louis, Mo.—"The Endonasal Route of Attack in Hypophyseal Tumor Cases."

Dr. John E. Brown, Columbus, Ohio—"Two Cases of Extensive Fibro-Myxoma of the Naso-Pharynx."

Dr. Samuel Iglauer, Cincinnati, O.—"On the Use of Electro-Magnets in the Extraction of Metallic Bodies from the Air Passages."

THROAT.

Dr. Will Haskins, New York City—"Nerves of the Nasal Passages and Throat." (By invitation.)

Dr. J. H. Johnson, Coffeyville, Kan.—"Reflexes from Elongated Uvula."

Dr. Gaylord Hall, Louisville, Ky.—"Chronic Peritonsillar Abscess."

Dr. Richard Lewisohn, New York City—"The Uses of a New Oesophagoscope."

Dr. Chevalier Jackson, Pittsburgh, Pa.—"Intratracheal Insufflation Anæsthesia for the Rhino-Laryngologist."

Dr. L. B. Lockhard, Denver, Colo.—"The Electric Cautery in the Treatment of Tuberculous Lesions of the Throat."

Dr. W. Scheppegrell, New Orleans, La.—"Epipharyngeal Diphtheria and its Relation to Epidemics of Diphtheria."

Dr. H. Moulton, Fort Smith, Ark.—"A Large Cystic Tumor of the Epiglottis."

Dr. Geo. A. Webster, Boston, Mass.—"Atropia in the Treatment of Acute Rhinitis."

Council.—Dr. John W. Murphy, Cincinnati, Ohio; Dr. J. O. McReynolds, Dallas, Texas; Dr. George F. Suker, Chicago, Ill.; Dr. J. J. Kyle, Los Angeles, Cal.; Dr. Emil Mayer, New York City; Dr. J. M. Ray, Louisville, Ky.; Dr. Percy Fridenberg, New York City; Dr. F. P. Calhoun, Atlanta, Ga.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

A FURTHER CONTRIBUTION TO THE STUDY OF DISEASES OF THE ACCESSORY SINUSES IN RELATION TO DISEASES OF THE EYE, AND THE SURGICAL METHODS TO BE ADOPTED FOR THEIR RELIEF.

J. H. Bryan (*Surgery, Gynecology and Obstetrics,* June, 1912) discusses this subject, reporting a number of cases of sinus disease with ocular complications, and states in conclusion:

"First, in my experience, the majority of severe inflammations of the sinuses are accompanied by more or less disturbances in the eye, these disturbances varying in intensity according to the severity of the sinus disease, and the reason they are not more frequently recognized is that they are not looked for until the eye manifestations are self-evident.

"Second. The change in the visual fields is a significant symptom of sinus inflammation, and is generally associated with disease in the anterior cavities, but is also frequently found in disease of the posterior sinuses.

"Third. Congestion of the papilla is an early sign of disease in the posterior sinuses.

"Fourth. A scotoma and enlargement of the blind spots are so frequently found in posterior sinuses inflammation as to make them almost pathognomonic.

"Fifth. There is no one operation that is suitable to all cases. The more conservative methods have relieved many serious cases, and if the conditions justify it the intranasal methods should be tried first. Failing to bring about relief in this way, then one of the more radical measures will have to be adopted; and the operation that offers the best chance of reaching thoroughly all the diseased parts of the frontal, ethmoidal and sphenoidal cavities is the Killian, and in maxillary sinus complications a combination of the Killian with the Caldwell-Sue operation."

MYOPIA PREVENTION BY TEACHERS.

W. H. Bates (*N. Y. Med. Jour.*, August 30, 1913) states that "myopia with elongation of the eyeball is incurable. It is usually acquired during school life. Acute myopia, spasm of the accommodation, or functional myopia is an early stage of incurable myopia. The cause of myopia is an effort to see distant objects." In corroboration of these statements he says: "1. Myopic refraction has always been produced in man and the lower animals when regarding unfamiliar distant objects which require an effort. 2. Myopia was prevented in the public schools of Grand Forks, N. D., for eight years by methods which prevented an effort to see distant objects. 3. Myopia was always benefited by treatment suggested by the cause. 4. The cause suggested a method for the experimental production of myopia in dogs, rabbits and cats. 5. Physicians, teachers, and others interested have investigated and confirmed these facts. 6. It should be emphasized that there is but *one* cause of myopia, an effort to see distant objects. There is no other."

Bates believes the cure for functional myopia, and therefore the prevention of axial myopia, is to have the children look at familiar distant objects. He finds the Snellen test card excellent for this purpose. The letters should be memorized and looked at each day for a short time. The results of the use of this method in a number of the public schools of New York City are given and the author thinks they are most encouraging, over 1,000 pupils with defective sight obtaining normal vision in both eyes.

SARCOMA OF THE CHORIOID.

A CASE WITH METASTASIS TO THE LIVER EIGHT YEARS AFTER ENUCLEATION OF THE EYE.

Aaron Brav (*Jour. A. M. A.,* August 30, 1913) reports the case of a young woman aged 18 years, in whom the vision of the left eye was reduced to light perception. The diagnosis of detachment of the retina with probably a tumor of the chorioid was made and enucleation advised. This was refused for four months, by which time there was much pain in the eye, tension plus 3, and the eye was badly inflamed. Then after repeated warning as to the danger to life she consented to enucleation. This was done and a pigmented tumor the size of a hazelnut was found in the eye. Microscopic examination proved it to be a melanotic sarcoma. There was no local recurrence of the trouble. However, eight years later the patient died of malignant growth of the liver. The case emphasizes the necessity of an early diagnosis and prompt removal of the eye in such cases, as it shows that in sarcoma of the chorioid metastasis with a fatal termination may occur any time after the eye has been enucleated, even if the tumor does not recur locally.

TREATMENT OF ACUTE DACRYOCYSTITIS.

F. H. Verhoeff (*Jour. A. M. A.,* March 8, 1913), following the suggestion of Agnew, opens a lacrimal abscess by cutting down into the sac between the caruncle and the inner commissure of the eyelids. This he contends, not only secures better drainage than by opening through the skin over the abscess, but avoids also the danger of a permanent fistula. Agnew used a Beer's knife but Verhoeff finds an angular keratome more satisfactory, there being less danger of injuring the cornea. He usually makes the incision under a general anæsthetic and immediately afterwards passes a large size probe through the wound and down through the duct. He finds it unnecessary to wash out the sac but every other day passes a probe under cocain anæsthesia. No hot or cold applications are made but the pus is kept washed out of the conjunctival sac with a boric acid lotion. His results with this treatment have been very satisfactory.

OCULAR DISEASES OCCURRING IN ASSOCIATION WITH DIABETES MELLITUS.

D. Matheson Mackey (*Practitioner,* May, 1913) mentions the following condition of the eyes, apparently caused by an associated diabetes: 1. Abnormal refraction and accommodation. Hypermetropia or myopia may develop, generally being temporary and often clearing up in several months or less. Subnormal accommodation or complete loss of accommodation result from the effect of the disease on the ciliary muscles. 2. Changes in the lens, either cataract, or "second sight" due to myopia caused by swelling of the lens. Diabetic cataract is the only form of non-traumatic cataract that is likely to clear up spontaneously. 3. Changes in the retina, diabetic retinitis. 4. Toxic amblyopia, where the papillo-macular bundle of fibres in the optic nerve is injured by toxic substances resulting from faulty metabolism, similar to the toxic amblyopia caused by alcohol and tobacco. 5. Visual faults due to cerebral lesions. 6. Paralysis of the extrinsic ocular muscles.

CONCERNING THE USE OF TUBERCULIN IN OPHTHALMOLOGY.

(With Report of Cases.)

W. B. Weidler (*Manhattan Eye, Ear and Throat Hospital Reports,* February, 1913), from his observations with the use of tuberculin, offers the following conclusions:

1. The Von Pirquet cutaneous reaction is quite certain in the young and fairly so in the adult, or those over 17 years of age.

2. In the treatment of keratitis or affections of the cornea, with the Von Pirquet positive, the injections of tuberculin never failed to cure the condition.

3. In the case of tubercle of the choroid where the reaction was positive, injections of tuberculin were of undoubted value, as it restored the vision from 5/200 to 20/20, and in the case of uveitis it brought the vision from 20/70 to 20/30. In both of these cases no other general medication was allowed, nor was it permitted in any of our cases reported in the paper.

4. The evidence collected from this brief study has been such as to make us believe that tuberculin therapy should always be used where there is the slightest suspicion of tubercular manifestation old or recent. We would also urge the more general use of tuberculin in the ophthalmic practice of medicine.

GONORRHŒAL CONJUNCTIVITIS ABORTED BY A TWO PER CENT. SOLUTION OF SILVER NITRATE.

J. Herbert Claibourne (*N. Y. State Jour. of Med.,* April, 1913), after first wiping the secretion from the conjunctiva of the everted lids with gauze, fills the whole conjunctival sac with a two per cent. solution of silver nitrate, allowing it to remain thirty seconds, and then wiping it away with gauze. The lids immediately become very red and begin to swell. Atropin is then ordered and a 1 to 3000 mercury bichloride solution used every two hours together with constant ice application. This treatment generally controls the condition in less than twenty-four hours, but is only applicable for the abortion of the disease in the early stages of the infection.

SCHOOL FOR HEALTH OFFICERS,

CONDUCTED BY HARVARD UNIVERSITY AND THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

Beginning this fall Harvard University and the Massachusetts Institute of Technology are to maintain in co-operation a School for Public Health Officers. The facilities of both institutions are to be available to students in the School and the Certificate of Public Health (C. P. H.) is to be signed by both President Lowell and President Maclaurin.

The object of this School is to prepare young men for public health work, especially, to fit them to occupy administrative and executive positions such as health officers or members of boards of health, as well as secretaries, agents, and inspectors of health organizations.

It is recognized that the requirements for public health service are broad and complicated, and that the country needs leaders in every community, fitted to guide and instruct the people on all questions relating to the public health. To this end, the instruction of the new School will be on the broadest lines. It will be given by lectures, laboratory work, and other forms of instruction offered by both institutions, and also by special instructors from national, state, and local health agencies.

The requirements for admission are such that graduates of colleges, or technical and scientific schools, who have received adequate instruction in Physics, Chemistry, Biology, and French or German, may be admitted to the School. The medical degree is not in any way a pre-requisite for admission, although the Administrative Board strongly urges men who intend to specialize in public health work to take the degree of M.D. before they become members of the School for Health Officers.

The Administrative Board which will conduct the new School is composed of Professor William T. Sedgwick, of the Massachusetts Institute of Technology; Professor Milton J. Rosenau, of Harvard; and Professor George C. Whipple, of Harvard. Professor Rosenau, of Harvard, has the title of Director, and the work of the School will be under his immediate supervision.

BOOK REVIEWS.

JULIUS HIRSCHBERG'S AUSGEWAEHLTE ABHANDLUNGEN, 1868 TO 1912. Zu Seinem siebenzigsten Geburtstage Ihm ueberreicht im Namen Seiner Schueler, von Oscar Fehr and Wilhelm Muehsam. Leipzig, Veit & Co., 1913. Price $7.20. (Julius Hirschberg's selected articles, 1868 to 1912. On his seventieth birthday presented to him in the name of his pupils, by Oscar Fehr and Wilhelm Muehsam.)

Fehr and Muehsam, in republishing in one volume the writings of their beloved teacher, have selected a new form of congratulatory gift, which certainly is an excellent one, and on which they in turn are to be congratulated. Hirschberg's writings cover so long a period of time and so vast a variety of subjects, though mostly of ophthalmic interest, that it is a great boon to have them collected in one volume. May be in this form much which modern writers often seem hardly to be familiar with will thus come to their knowledge.

That the selection was made with the necessary circumspection is the more certain, since Hirschberg himself aided in it.

A portrait showing Hirschberg at his seventieth birthday accompanies the volume, and it is a pleasure to see that age has as yet in no way bent the indefatigable spirit of this great scientist and oculist. May it be given to him to teach by mouth and pen for many a year to come!

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ORIGINAL ARTICLES.

KERATITIS DISCIFORMIS.

PROMPT RECOVERY FOLLOWING SUBCONJUNCTIVAL SALINE INJECTIONS.

By John Green, Jr., M.D.
ST. LOUIS, MO.

H. G., male, age 40, first seen May 6, 1913. Patient is a stocky, well built farmer, in good physical condition. Has not been sick for years. Denies syphilis. Seven years ago suffered an attack of inflammation in left eye, nature undetermined, but probably some sort of conjunctival affection as he made a prompt recovery without impairment of vision.

In the latter part of March, 1913, left eye again inflamed, ascribed by the patient to getting dust in the eye. Treated by an oculist in his home town with temporary improvement. Relapse two weeks before coming under my care. Complaints: Misty vision, photophobia, lacrimation.

The left cornea is the seat of a circular grey infiltration, homogeneous to naked eye inspection, but seen, with the loupe, to be made up of closely packed, roughly circular dots which tend to merge. The infiltration is situated in the middle layers of the cornea. It is bordered by a rim of deeper grey which sharply delimits the lesion from a ring of clear cornea. A few vessels pass deeply from the upper limbus to the upper part of the infiltration. There is moderate ciliary injection and photophobia. No iritis. Conjunctiva hyperæmic and velvety, with slight discharge. Eyeground normal, as well as could be determined through the corneal haze. No staining to fluoroscein. Hypæsthesia of the affected cornea. R.V. 5/5; L.V. 1/50. The clinical picture left little room for doubt that I was dealing with an example of keratitis disciformis.

Treatment consisted of silver nitrate 1/5 per cent. once daily, followed by hot saline irrigations, argyrol 5 per cent. three times a day, and 10 per cent. dionin solution. After three weeks no material change in the appearance of the lesion, and but slight improvement in vision. May 27, injected subconjunctivally 15 minims 2 per cent. saline solution and repeated two days later. Patient allowed to go home. On his return one week later, I was gratified to find that the area of infiltration had shrunk and was thinner. V. 5/25. Ciliary injection and photophobia almost gone. From June 5th to July 28th he received weekly injections. On the latter date, the infiltration had cleared except for a small nebula at the corneal centre. All irritative signs had disappeared and V.=5/8.*

Keratitis disciformis, or keratitis annularis et disciformis, as it was named by Fuchs who first accurately described this form of corneal inflammation, is a disease of middle life. The following is a slight abridgment of Fuchs' description (Text Book, 4th Am. Edition, 1911, p. 259). Keratitis disciformis consists in the development in the middle layers of the cornea of a grey disk-shaped opacity, in the center of which a small more deeply clouded speck is commonly observed. The periphery of the disk is sharply delimited by a border of deeper grey which, in many cases, is made up of concentric lines. Rarely a small loss of substance develops over a circumscribed area. The irritative symptoms are not pronounced and hypopyon is absent or scanty. Superficial and deep vessels may extend into the infiltrate. The course of the disease is protracted.

The appearance of the cornea is sufficiently characteristic. The disease should, however, be carefully differentiated from keratitis profunda, which, to casual inspection, presents some features of similarity. In the latter a grey, more or less centrally located, opacity made up of striæ and dots *merges gradually* into transparent cornea. The opacity of keratitis disciformis appears homogeneous and is *sharply demarcated* from the clear surrounding ring of cornea.

Opinions differ as to the ætiology of the affection. According to Fuchs' view, the trouble begins as an ectogenous infection, the central greyer speck representing the point of entrance of the bacteria. Trauma and herpes corneæ account, according to this author, for the epithelial lesion that precedes the infection. According to Erdmann (*Zeitsch. f. Augenheilk.*, XXII, p. 30) the tissue necrosis of disciform keratitis is due to disturbed innervation, i.e., the disease is to be classified as a neuropathic affection. This view is shared by Verhoeff (*Trans. Sec. on Ophthal., A. M. A.*, 1909) on account of hypæsthesia of the affected cornea and the frequent association with herpes. The only histologic examination is that of Meller (*Klin. Monatstbl. f. Augenheilk.*, Oct., 1905), who described an inflammatory infiltration surrounding a point of infection and extending superficially and into the depths of the cornea. The chronic irritation of the eye he regarded as an expression of the reaction of the healthy tissues to this infiltrate which rapidly becomes necrotic. Bacteriological examination was negative.

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*Patient seen again Oct. 7th. Eye had remained well during summer. V.=5/8+. Still faint central nebula.

Keratitis disciformis has generally been regarded as a self-limited disease, practically uninfluenced by any form of treatment and terminating in more or less opacity, due to the formation of scar tissue. Posey, who in 1904 recorded the first American case, remarks that "therapeusis is unavailing." This view is shared by most text book writers, who content themselves with offering such therapeutic suggestions as would presumably be of benefit in any chronic corneal inflammation.

The prompt improvement and rapid cure following repeated subconjunctival injections of a 2 per cent. saline solution, after the failure of classical methods, suggests that, after all, the course of the disease may be shortened and the final outcome restoration without serious impairment of vision.

SEVERE IRIDOCYCLITIS WITH HYPOPYON FOLLOWING CATARACT EXTRACTION.

RECOVERY WITH EXCELLENT VISION.

By John Green, Jr., M.D.
ST. LOUIS, MO.

A mild form of iritis is a not unusual event in the postoperative course of cataract extraction. The trauma to the iris, especially in the combined operation, coupled with the irritating effect of cortical remains, accounts for an inflammatory reaction which, as a rule, yields readily to mydriatics. The eye recovers perfectly, with only one or two delicate synechiæ to indicate the antecedent iridic inflammation.

Less frequently the inflammation is of the plastic type. Fibrinous debris clouds the anterior chamber and glues the iris to the lens capsule. Ciliary congestion and exquisite tenderness on pressure indicate the involvement of the ciliary body. Such an eye is seriously compromised and the surgeon may congratulate himself if recovery, which is apt to be delayed for a long time, eventually ensues. The outlook is even more dubious when, in addition to the signs of plastic inflammation, hypopyon develops. Under these conditions the therapeutic resources of the surgeon are taxed to the utmost, and a favorable outcome is to be hoped for rather than expected.

C. M., male, age 60, Irishman, had bilateral nucleocortical cataract. At the first observation, January 15, 1912, R.V. 5/10; L.V. 5/64. In 1910, he had undergone perineal prostatectomy. Always an excessive user of tobacco and in former years a free drinker. As the lens peripheries were fairly clear, he was enabled to continue his work by the daily use of a mydriatic (euphthalmine).

February, 1913, R.V. 5/32; L.V. 1/20. Blood pressure, systolic 160 mm. Hg. Diastolic 55 mm. Hg. Urine had low spec. grav., was alkaline and contained pus (chronic cystitis).

April 22nd: L. upward section with conjunctival flap-iridectomy. After several attempts delivery of a large amber-colored nucleus (delivery probably impeded by too restricted cystotomy). No visible cortex. Toilet easily accomplished. No loss of vitreous.

April 25th: Lips of wound in apposition. Anterior chamber reformed. Pupil black, semi-dilated. Atropin instilled.

April 28th: Wound healed. Ciliary injection. Aqueous cloudy. Ordered calomel gr. 1/10 every two hours and atropin 2 per cent. every three hours.

April 29: Fully developed iridocyclitis. Aqueous very cloudy; iris swollen and discolored, fails to respond to atropin, slight hypopyon. Intense ciliary congestion. Severe pain. Hand movements at one foot. Ordered calomel gr. 1/10 every hour. Locally, atropin, dionin (powder), hot boric packs. Lavage with hot bichloride 1/10000.

April 30th: All above signs and, in addition, hypopyon has increased. Now reaches ¼ height of anterior chamber. Ordered urotropine, gr. 7½ every two hours. (Calomel stopped.) Locally, treatment continued. Applied leeches to temple. Patient seen by Drs. A. E. Ewing and L. H. Hempelmann in consultation.

May 1st: A.M., fairly good night, hypopyon slightly diminished: P.M., hypopyon nearly gone. Aqueous clearer. V. hand motion at two feet. Has received 75 grains urotropin in past 24 hours.

May 2nd: Urotropin continued, given in addition agurin (ascet-theobromine sodium), a diuretic, 3 grains, every four hours. Hypopyon entirely gone, pupil appreciably wider, aqueous less cloudy; vision, fingers at one foot.

May 3rd: Urotropin continued, but in diminished doses (gr. 15 three times a day). In addition, given sodium salicylate, gr. 15 every three hours.

From this date improvement in the eye was continuous. Utropine continued in diminished doses (30 grains daily) up to and including May 6th. From this date to May 25th, when patient left the hospital, general treatment consisted of aspirin, grains 10, three times a day. At the present writing, September 30, 1913, the eye is perfectly free from irritation. There are a few adhesions of the iris to a delicate secondary cataract. There is, however, a clear opening in the upper part of the membrane through which the fundus details can be clearly seen. Left vision +10+2 c. ax. 150 5/8+. Patient reads ordinary newspaper print with fluency.

Hexamethylenamin was first prepared by Butlero in 1860. It was introduced into therapeutics by Nicolaier in 1894, under the name "urotropin." It is formed by the action of ammonia on formaldehyde, according to the formula $4\ NH_3+6\ HCHO=(CH_2)_6\ N_4+6\ H_2O$. It is hydrolyzed on boiling with dilute acids, yielding formaldehyde and ammonia, and the same action ensues in neutral aqueous solutions when heated about 50° C. It is excreted through the kidneys, bile, pancreatic juice, saliva and milk, and is also found in the cerebral fluids, pleural effusions and in the aqueous. Hæmaturia has been noted after large doses.

Of special interest to ophthalmologists are the experiments of Gradle (*Ophthal. Record,* 1911, p. 110). He found that in rabbits urotropin is excreted into the anterior chamber three hours after ingestion, reaches its maximum excretion in seven hours (about 1/75000) and is excreted in greater quantities after repeated paracenteses. He noted, further, that excretion into the anterior chamber is increased by the use of mydriatics; that urotropin in the concentration in which it occurs in the anterior chamber does not inhibit the growth of virulent organisms in the test tube. He also found that urotropin is excreted in the tears in greater concentration than in the aqueous. He believes that the drug in this weak concentration will at least weaken infecting organisms sufficiently to allow them to be more easily attacked and killed by the normal antibodies in the various secretions. As the author well remarks, "this would be especially true in cases of perforating injury or postoperative infection where but few organisms gain admittance to the eye, and where there is a constant change of aqueous humor due to the opening of the anterior chamber." Gradle remarks that pneumococci, which are the principal organisms in post-operative iritis and infection after perforating injury, grow with difficulty in the anterior chamber, being rapidly attacked by anti-bodies and killed.

I cannot disabuse my mind of the conviction that in this case an endogenous infection, which was rapidly becoming virulent, was converted into a milder form by increased antisepsis of the aqueous through the excretion of urotropin.

TWO CASES OF NÆVUS OF THE CONJUNCTIVA BULBI.

By Adolf Alt, M.D.
ST. LOUIS, MO.

The question of the origin and nature of nævi does not seem as yet to be quite settled. In the main the authorities are still divided in two camps. Ribbert maintains that pigmented nævi take their origin always from pigment carrying connective tissue cells, the chromatophores. Unna sees their source in the epithelial cells, and especially in those of the basal layer. Nævi of the conjunctiva offer an especially fine subject for investigation.

In Graefe's Archiv., Vol. LXXI, part 2 (1909), M. Wolfrum has published an exhaustive paper on extensive studies made on eleven cases of nævus of the conjunctiva, caruncle and plica semilunaris. From these he is in a position to forcibly uphold the opinion of Unna, that the nævus cells are epithelial cells which have become separated from their neighboring cells and, so to speak, dropped down into the underlying tissue. He does not accept Kromayer's opinion, according to whom such epithelial derivates are later changed into connective tissue cells, and can find nothing to prove a connective tissue origin of nævi.

According to Wolfrum the development of a nævus of the conjunctiva from the epithelial cells can be studied in all its phases and happens about in the following manner. It begins with the disappearance of the intracellular fibrils and protoplasmic anastomoses, especially in the basal epithelia. Gradually one or more cells are in this manner freed from their union with the neighboring cells and at first lie isolated between them. Wolfrum states that in the great majority of the cases this takes place in the basal layer of the epithelium. He thinks this isolation is due to the absorption of the fibrils and offshoots by the cell itself. Such an isolated cell is gradually surrounded by fluid, which increases in quantity. As the pressure from this fluid gradually grows, it gets finally too strong for the opposing basal membrane and breaks it. In this way an opening is formed through which the epithelial cells get into the underlying connective tissue. This whole process is looked upon by Wolfrum as due to a state of increased activity in the cells; this is clearly demonstrated by the further wandering of such cells into the underlying tissue. The process is the same whether it concerns one or two cells or whole cell complexes. In the latter cases larger epithelial bodies intrude into the underlying connective tissue, giving pictures not unlike those which epitheliomata present. Having thus become isolated from the epithelial layer, and growing at the expense of the underlying tissue, such a nævus cell has assumed characteristics which approach those of the cells of malignant tumors rather closely. However, the nævus can exist for a long period and grow to some extent before it may assume a malignant character, and it may never assume it.

Among Wolfrum's conclusions we find the following:

"The pigmentations which we find in the conjunctiva must in most cases be looked upon as nævi, since besides the epithelial pigmentation we find in the subconjunctival connective tissue, too, more or less pigmented cell aggregations, the epithelial origin of which can with careful searching in the earlier stages be proven in every single instance.

"The capabilities of these cells to act histolytically and to wander they share with the tumors and must be considered as characteristics similar to those of the latter.

"Therefore tumors growing from these cell aggregations must be considered as carcinomata, yet not as carcinomata in the usual meaning of this word. Since they develop mostly from basal epithelial cells we must designate them as basal cell carcinomata."

It is not my intention, nor am I in a position to reopen a question which has engaged so many authors before this. I simply want to report here two cases of nævus of the bulbar conjunctiva which I have recently had occasion to examine, and which seem to illustrate some of the conditions described by Wolfrum particularly well, and thus to support his contentions and the opinions of those who find the origin of nævi in the epithelial tissue.

The first specimen was given to me by Dr. W. J. Charles, of this city; perfectly fresh after removal from the eye. It was taken from the nasal side of the bulbar conjunctiva of a young lady. It had been noticed as a small brownish spot for a number of years, had of late been seen to become darker and to increase in size. These, as far as I can remember, were the main points in the history of the case, which can now not be found.

The little tumor was very thin. It was hardened and fastened flat to a piece of cork in the usual manner.

On section the surface epithelium, which in places is quite deeply pigmented, is somewhat thickened. The chief alterations concern its basal layer. This has lost its regular arrangement here by the beginning and there by the finished isolation of a great number of its cells. Near the edges of the tumor such isolated cells have in small heaps dropped through the torn basal membrane into the underlying connective tissue, forming small pegs surrounded by open spaces which were probably filled with fluid. These isolated cells take on a very deep stain with hæmatoxylin. In the thickest part of the tumor the nævus cells are seen to have formed numerous cell cylinders which lie parallel to the surface in one or two rows, reminding one very much of the arrangement of the cell cylinders of an epithelioma. I have nowhere been able to find secondary cell cylinders leaving these primary ones at a more or less right angle, neither is there anywhere an inflammatory infiltration in their neighborhood.

The pigment, of a granular nature, varied considerably in quantity in the nævus cells, while larger numbers were perfectly free from it; others were partly or totally filled with pigment varying in depth of color. While in most cells it is light enough to allow a good view of the nucleus, it is so dark in others that it is impossible to see the nucleus at all.

There are certainly no pictures in the sections of this tumor which could in any way lead one to think of a derivation of the nævus cells from connective tissue cells. (See Fig. 1.)

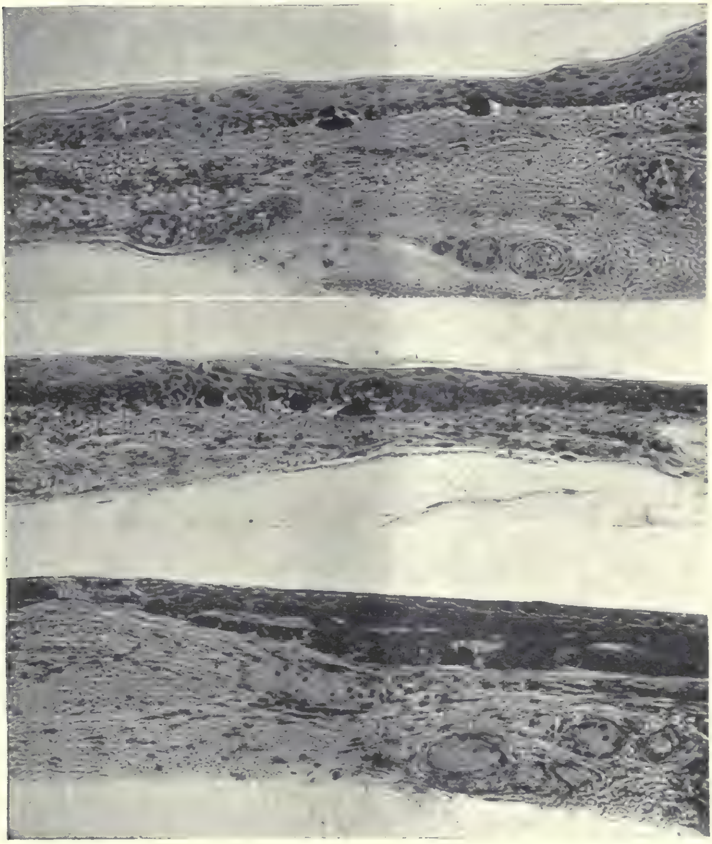

FIG. 1.

The second specimen is from a considerably older individual, a gentleman, who also stated that a brownish spot on the nasal side of the bulbar conjunctiva of his left eye had, after having been quiescent for many years, of late seemed to have grown appreciably in size and perhaps in darkness of color.

This little tumor, however, showed a very small amount of pigment, which, moreover, is quite light in color.

Sections from the periphery show a considerable thickening of the epithelium. Here the basal layer is very much disturbed; in some parts even the more superficial layers, too, seem to share in the process of cell isolation.

In some sections the nævus cells are found in the underlying connective tissue in the form of more or less well defined cylinders; in others there seems to be no special arrangement, the cells lying in the tissue loosely or more densely packed resembling a round cell infiltration. (See Fig. 2.)

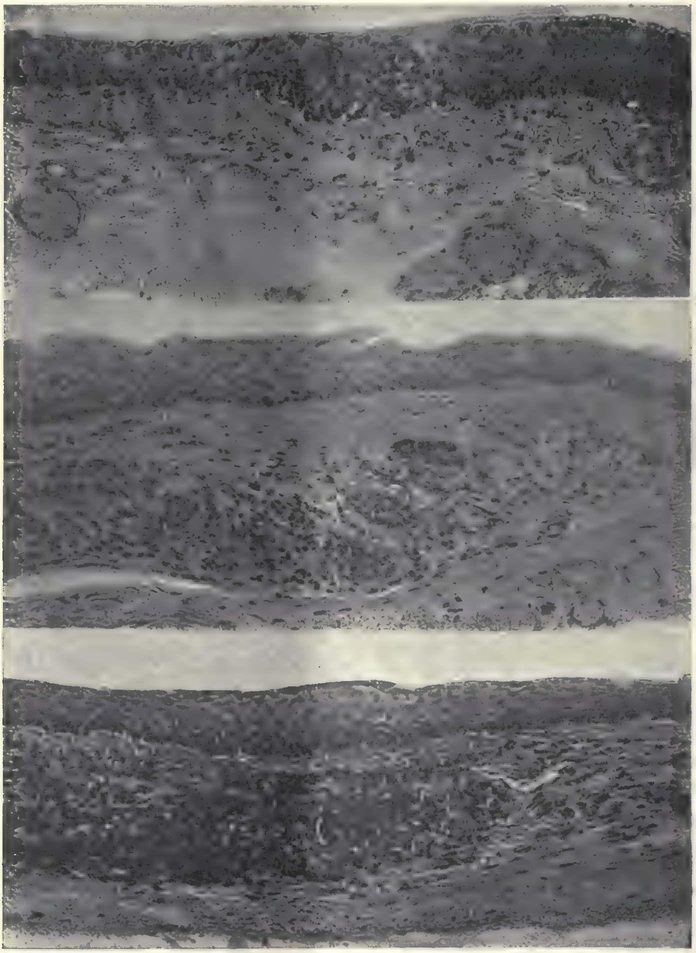

Fig. 2.

In the center of the little tumor the process of epithelial cell isolation and dropping into the underlying connective tissue seems to be especially well shown. Here the basal membrane can be recognized easily, being stretched toward the underlying tissue so that it forms a series of festoon-like lines, through openings in which the epithelial cells have penetrated in large numbers into the connective tissue. It seems to me that the accompanying photograph is a particularly instructive one. (See Fig. 3.)

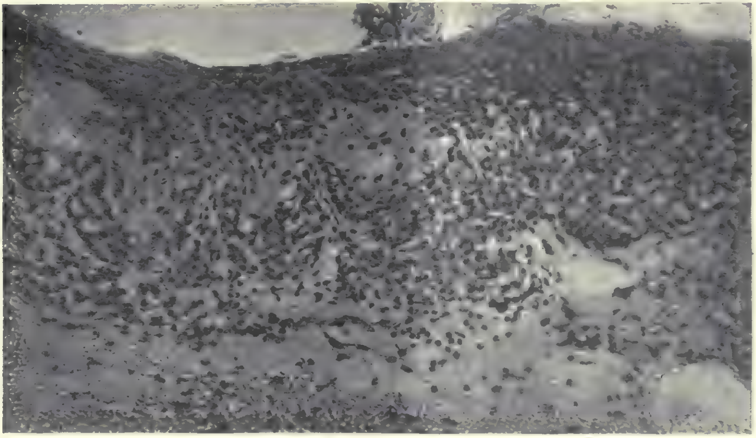

FIG. 3.

The question of the origin of pigmented conjunctival tumors from nævi has been one of much research, but it seems there can be no doubt that nævi often are the beginning of such tumors. It is well known that histologically it is sometimes quite difficult to place these pigmented tumors in their proper class, since they appear in parts to be sarcomatous, in others epitheliomatous. Since true nævi definitely seem to be formed by an alteration in the epithelial cells, and since, as Wolfrum says, we have to look upon them as a special kind of basal cell cancer, it would follow that it is wisest to remove every nævus of the conjunctiva as soon as it comes under our hands.

TRANSLATIONS.

SPONTANEOUS ABSORPTION OF SENILE CATARACTS.*

By Dr. L. Verrey,

LAUSANNE.

Translated by Adolf Alt, M.D.

Cases of spontaneous absorption of senile cataracts are sufficiently rare and the mechanism of this absorption is still so obscure that the few observations which to encounter may be given to each one of us must not be passed over in silence. We thought it of interest to report the following facts:

On November 15th, 1910, F. Simeon, from Villars-Epenay (Vaud), a man 66 years old, presented himself. His left eye had been operated on for cataract by Dr. Eperon in 1891. This operation had had a satisfactory result. Examination shows enmetropia and V.=1/6, not further improved by glasses.

He relates that his right eye had been slightly affected already when the left one was operated on, but that for a good many years its condition had remained apparently unchanged. Then the eye very gradually got worse, till since about six months he could no longer count fingers with this unoperated eye. During the summer of 1910, however, the eye seemed to become spontaneously clearer from day to day, and finally noticing in these last weeks a very pronounced improvement in vision, he had decided to consult us to find out whether glasses could not be prescribed which would help him to make still better use of this right eye.

The examination gave V.=1/6 with +1.5 D.; exactly the same visual acuity which the operation had given to the left eye. With oblique illumination the pupillary area is absolutely black, showing just a few disseminated whitish points which evidently represent the posterior lens capsule. With a medium wide pupil I cannot with the ophthalmoscope see anything behind the iris or in the depth of the vitreous body which might resemble the remainder of a dislocated cataract. A second examination, made a few days later, the pupil being dilated with atropin, gave similar results. I noted down at that time: pupil perfectly round, absolutely no adhesions. No remnant of a thickened capsule in the lower part of the pupil or behind the iris. The ophthalmoscope revealed a large posterior staphyloma, about of the size of the diameter of the papilla or even more, to the temporal side of the disc with some irregular prolongations toward the macula. Examining the periphery of the retina I found downwards and a little removed from the ora serrata numerous white choroiditic patches surrounded by dense pigment deposits.

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*Archives d'Ophtalmologie, September, 1913.

When I reported the results of my examination to Doctor Eperon he was kind enough to furnish me with the following notes. He writes: "Here is what I find in my case book concerning Mr. F. Left eye, extraction of mature cataract in 1891 with as good a result as possible. At that time the right eye had V.=1/30 with —10 D. (The left eye must have also had a high myopia, about 20 D.) The right showed a beginning nuclear and cortical cataract

"I did not see Mr. F. again until December 13th, 1898. His left eye was good; his right eye had a mature cataract, was slightly hypertonic; there were pains and injection. I prescribed pilocarpin, since he did not seem inclined to undergo a second operation. Mr. F. came again, and for the last time, on October 4th, 1906, suffering from another slight attack of glaucoma; the cataract was unchanged. I prescribed eserin. At that time he stated that he had no light perception whatever in the right eye."

The following points are of interest, it seems, in this observation:

(1) The early beginning of cataract formation. Mr. F.'s left eye was operated on for cataract when he was only 46 years old, and at that time the other eye had already begun to become cataractous. This, therefore, cannot be called a case of real senile cataract, but must be looked upon as a cataract due to causes other than those which age alone produces.

(2) As regards the right eye, in which the spontaneous absorption took place, Doctor Eperon reports two attacks of glaucoma, of sufficient severity at the examination on September 4th, 1906, that the patient stated that he had no light percepception at all.

(3) The third point which seems to be of interest concerns the lesions in the fundus of the eye.

a. Choroidal lesions as they are ordinarily found in high myopia; posterior staphyloma with prolongations toward the macula.

b. The presence of large choroiditic patches in the periphery of the choroid and downwards near the region of the ora serrata.

The recent researches of Louis Dor, which are collected in his interesting article in the Encyclopédie Française d' Ophtalmologie, tend to prove that the formation of a senile cataract is a process of hydration. According to Roemer this is due to a hydrating ferment circulating in the blood. This, then, is the most modern conception of the ætiology of senile cataract! However, it is permissible to reason that, if these are the only causes which may be adduced in the development of a cataract in aging and otherwise healthy individuals, the spontaneous appearance of a cataract in old individuals without any evidence of heredity, of a normal general constitution, is often due to local ocular causes, or, in other cases, to general causes which can be well demonstrated. In our case the influence of a high myopia and its choroidal complication appears incontestible.

Yet, though these local ætiological causes of cataract are pretty certain, it seems on the other hand that a more or less pathological condition of the eye may, if not provoke, at least favor the spontaneous absorption of a cataract. This fact was noted by Reuss, of Vienna,[1] in two cases published by him in the first of which the spontaneous absorption had followed apparently an attack of iritis in a myopic eye, while in the second one the absorption had been preceded by two inflammatory attacks (uncontrolled by the physician) and a fall on the head which raised the question of a possible tear in the lens capsule. However, for various reasons advanced by Reuss he did not think that this had happened. This author adds: "When we read all the published cases of this kind we are struck by the fact that in more than half of them ocular complications existed; glaucoma in seven cases, in an eighth one a glaucomatous excavation was found after the absorption was completed; in Reuss' first case an iritis; in Czermak's case old synechiæ; in Vossius' case the absorption coincided with an iridocyclitis; in Berlin's case an iritis; in Hilbert's case old choroiditic patches; the same in Reuss' second case; in the cases of del Monte, Brettauer and Mitvalsky numerous vitreous opacities. In summing up we find in 34 cases spontaneous absorption, 15 with complications."

Since the time when Reuss published his article (1900) I find that Trousseau,[2] also, like Reuss, notes "the curious combination of glaucoma and absorption of the cataract, as if it was apt to happen more easily in pathological eyes than in normal ones." Natanson,[3] having reported two cases of his own, mentions in his second paper 33 which had appeared previous to 1897. I draw the attention of those interested to this bibliography.

By my own personal researches, I found published since that time the cases of Cazales[4] (Béziers). Without viewing it as a relation of cause and effect, reports in his second case glaucoma preceding the spontaneous absorption. Then I find two cases of Augièras[5] (Laval) who, also, without giving any special importance to it, speaks of a severe iritis having preceded the absorption of the cataract in his first case.

Harms[6] in his paper gives the pathological anatomy of an eye enucleated on account of glaucoma following the dislocation of a partially absorbed crystalline lens. He points out especially the fact, already mentioned by von Hippel and others, that the capsular epithelium had disappeared.

In passing to this subject it may be well to formulate the two opposite opinions which are held regarding the role played by the disappearance of the capsular epithelium in the spontaneous absorption of a cataract. While Professor Eugen von Hippel[7] in giving the anatomical description of a case of advanced absorption of a cataract in which the capsular epithelium had altogether disappeared, concluded that it is necessary that the epithelium has primarily disappeared in order to allow the aqueous humor to penetrate into the lens and cause its gradual absorption; and while von Hippel[8] also points out the importance of this disappearance which favors the penetration of the aqueous humor, and questions what could cause this disappearance of the epithelium, Harms explains this disappearance by the long duration of the cataract which is stated as a fact in all cases of spontaneous absorption. For him this disappearance of the capsular epithelium is a fact which must be noted and is certainly of importance, yet he finds no relation of cause and effect. Concerning at least the cortical substance, he thinks it becomes absorbed before the epithelium disappears, which happens only in consequence of the beating against the capsule by the ballotting of the nucleus.

Axenfeld, cited by Harms, thinks like Natanson that the absorption of the cataract within the capsule is only the termination of a Morgagnian cataract of long standing and that the disappearance of the epithelium has nothing to do with the absorption of the lens.

However this may be, and to come back to our starting point, it seems well established that spontaneous absorption if not provoked is at least facilitated in a pathological eye, and that among the lesions cited glaucoma plays a preponderating role. For who can say that in the cases in which we are told of iritis, choroiditic lesions, or abundant vitreous opacities, these patients have not, perhaps, passed through one or more periods, more or less short or more or less prolonged, of an increased intraocular pressure, not sufficiently severe to drive the individual to consult a physician, nor being accompanied by severe pain or dimness or abolition of vision, which they would naturally attribute to the cataract. I am therefore inclined to believe that as the number of such cases increases and the attention is drawn to this point, we shall place an increasingly greater importance to glaucoma as an ætiological cause which, at least, facilitates the spontaneous absorption of cataract.

In what manner does glaucoma act? Is it by facilitating the entrance of aqueous humor into the lens through, so to speak, a break in the continuity of the capsular epithelium, this break being due to the long duration of the cataract and the consequent disorganization of the epithelium? This is simply a hypothesis. I leave to others the task of explaining this point, which cannot be cleared up except by many microscopical or perhaps experimental researches.

However, we might still consider whether in those cases the increase of the intraocuular pressure is not due to the increase in volume of the crystalline lens. This is well possible and even probable in some cases. It does, however, not alter what we have stated. Even if the primary cause of the glaucoma resides in such an increase in volume of the crystalline lens, its effects would anyhow be what we described; and if this augmentation in volume should really in the majority of the cases be the cause of the glaucoma, we would once more see the forces of nature working towards a *restitutio ad integrum,* or at least towards the restitution of function of the organ in the following circle: development of the cataract, swelling of the lens causing glaucoma, which in turn provokes or favors the absorption of the cataract.

It is not astonishing that there is a greater tendency to the development of these different pathological conditions in eyes previously diseased by myopic choroiditic patches, old iritis or choroiditis, than in an eye which has been perfectly healthy up to the beginning of a senile cataract. We can also easily comprehend that, as we have seen in our case, the spontaneous absorption of a cataract takes place especially in comparatively young individuals in whom the formation of a cataract is due rather to intraocular causes than to the hydrating ferment which is said to cause senile cataract, which I still consider as somewhat hypothetical.

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INTERNATIONAL TRACHOMA PRIZE.

The Royal Hungarian Minister of the Interior has offered a prize of 1000 kronen for the best work on the ætiology of trachoma. The condition is that the original work marks a valuable step forward. It must be sent in on June 30th, 1914 (address: Budapest I, Var, Belügministerium).

Papers which have first appeared in print in 1913 or 1914 can, also, be submitted. The authors may employ the Hungarian, German, French or English language.

The jury will be nominated by the Royal Hungarian Minister of the Interior. The judgment of the jury will be published at the 13th International Ophthalmological Congress at St. Petersburg in 1914.

Dr. Emil von Gróse,
Government Commissioner on Trachoma.

MEDICAL SOCIETIES

OPHTHALMIC SECTION,

St. Louis Medical Society.
May 7, 1913.

A Case of Anterior Polar Cataract with Nystagmus and Spasm of Facial Muscles.—By Dr. Clarence Loeb.

M. B., age 10, came to the clinic on April 19, 1913, complaining of difficulty in seeing at school. The right eye was apparently normal but the left eye had a leucoma lying almost directly over the pupil, and of considerable size. The pupil was small and drawn forward by adhesions to the posterior surface of the cornea. The mother stated that the child's left eye was inflamed at the age of three days and at no time has she been able to see anything. The vision was doubtful perception of light. On closing the right eye, the left made violent nystagmic movements, both horizontal and rotatory. On occluding this eye with the obturator and directing the child to look at the test chart, there was a spasm of the left orbicularis palpebrarum, accompanied by twitching of the whole left side of the face, especially of the corner of the mouth.

Under atropine, the pupil has dilated well, except at a couple of places where it is still adherent to the cornea. In the pupillary area is seen a small white spot, evidently an anterior polar cataract. Since the use of atropine the nystagmus and the spasms of the muscles are much less pronounced.

The theory of the ætiology of anterior polar cataract being a corneal ulcer, followed by perforation and anterior displacement of the lens, which resumes its original position when the cornea heals and the anterior chamber is established, but retains as a souvenir of the disease an opacity of its capsule and anterior lenticular layers, is no doubt well known to you, and receives a distinct support in these cases, and as proof of the causal and not accidental relationship of corneal and lenticular lesions, I am able to report a second case which came to the clinic a couple of days ago but which I am able to present this evening. There was the same history of blenorrhœa neonatorum, and the same condition of corneal leucoma, anterior synechia, contracted pupil and anterior polar cataract.

As the patient is very young—5 years—I shall have to gain his confidence before I can make any further test or demonstrate him.

As an interesting coincidence, I desire to report the case of a man who had some inflammatory condition of the right eye about ten years ago. I saw him a few days ago, for the first time, and found a dense leucoma of the cornea and only perception of light. On dilating the pupil with homatropine, white masses could be seen in the pupillary area, but whether they were remnants of the capsule or a mature cataract, I was unable to determine. The case is still under observation.

A Typical Case of Retinitis Pigmentosa: Mr. A. M., age 48, came to the clinic at the Alexian Brother's Hospital, on February 20th, complaining of poor vision. Left eye had been affected for five years and right eye for about two years. Gives a doubtful history of lues twenty years previously. R.E., V.=6/15; L.E., V.=1/15.

Ophthalmic examination; right disc slightly smaller and paler than normal; arteries are very small and thread-like. A few foci of pigment collections in retina. L.E. same as right and in addition the periphery everywhere shows foci of pigment degeneration of the retina in the form of more or less globular masses of pigment. Some are crescentic and a few are stellate. Further questioning revealed the history that in 1896 his vision had been very bad but had become better under treatment. Is worse at night than during day time. Is at present on mixed treatment and vision is, R.E. +6/8. L.E. =1/12; not improved by glasses. The visual fields, taken May 3rd, will be passed around. The patient has three children, whose eyes I have examined, and found normal.

DISCUSSION.

Dr. Post: The cause of congenital anterior polar cataract interests me, especially since a late experience in my practice. An explanation has been offered that it was due to perforation of the cornea in utero. This always seemed doubtful, if not impossible to me, till the experience which I refer to suggested how an ulcer of the cornea in utero might be caused. A little girl four or five years old was taken to Dr. Louis Butler, of this city, for an arthritis of the wrist of one arm. The inflammation was quite severe and afterwards attacked the elbow joint.

Shortly afterward (not before the onset of the arthritis) a very violent conjunctivitis developed, which proved to be gonorrhœal and the pus was loaded with gonococci. The conjunctivitis went through the ordinary course. The child recovered perfect sight. The child had, as I recollect, a vaginitis. We know that gonorrhœal vaginitis in children is not uncommon. The books speak of a metastatic gonorrhœal infection of the eye as attacking the uveal tract—the ciliary body and the iris—but I found a reference to gonorrhœal ophthalmia or conjunctivitis, being produced by metastasis from a uteral or vaginal gonorrhœa. The metastatic cyclitis or iritis usually appears after the vaginitis or urethritis has run its course. In gonorrhœa the gonococcus is found in the blood, and when there is a gonorrhœal inflammation of a joint, the gonococcus is sometimes found in the joint itself. This suggests the question,—could a gonococcus, starting from a vaginitis in a pregnant woman enter her general circulation, pass through the placenta into the fœtal circulation and from that, instead of passing through the serous membrane into a joint, pass through the mucous membrane into the conjunctival sac and there produce a gonorrhœal ophthalmia in utero? If this is possible, a perforating ulcer of the cornea might easily occur in utero, resulting in anterior polar cataract.

The gonorrhœal conjunctivitis in the case which I have referred to, and which I have reported elsewhere, seemed to come from the gonococcus in the blood and suggested to me the above possible explanation of congenital anterior polar cataract. I searched the literature at my disposal and found nothing that I could quote in my report.

Dr. Loeb: I am pretty certain that I have read about cases of metastatic gonorrhœal conjunctivitis, though I have never seen one.

Dr. Post: The books speak of a metastatic gonorrhœal infection of the eye, as I said, an infection which manifests itself by irritation of the iris and ciliary body. They speak of it as being a mild inflammation of the iris, not a gonorrhœal conjunctivitis.

Dr. Loeb: We are confusing two different conditions, the anterior polar cataract which is the result of the corneal ulcer and the anterior capsular which is a congenital condition, which Weeks ascribes to a partial retention of the pupillary membrane. I fail to see with that explanation why it is necessary to assume a gonorrhœal intrauterine inflammation. I am not well enough acquainted with this to know whether we have true congenital cataract.

Dr. Luedde: I have seen anterior polar cataract in which there was no demonstrable corneal lesion. I do not think it is always necessary to assume a corneal ulceration to explain this type of cataract.

Inoperable Orbital Sarcoma Cured (?) by the Use of Coley's Fluid.—(Two cases)—By Dr. W. Luedde.

Coley's fluid consists of the mixed toxins of the streptococcus and bacillus prodigiosus. Its use in combatting the growth of sarcomata is empirical. It is most of all justified in cases where an inoperable secondary growth follows the unsuccessful surgical removal of the primary growth of our cases. The first case, T. W., white, age 12, in which a recurrence of the growth happened after two attempts at removal of the tumor mass and again after a complete exenteration of the orbit, has remained free from any sign of a relapse for nearly six years. He came under my observation through the courtesy of Dr. H. G. Mudd, who performed the last operation and directed the successful use of Coley's fluid. Except during an acute inflammation of the nasal sinuses, which caused a temporary swelling, there has been no disturbance whatever in the right orbit. The operative defect is perfectly covered by a flap from the right cheek. He is now 18 years old and appears to be strong and well. He is brought here in this connection because it was the success in his case which led to the use of the fluid in the recent case.

Miss E. M. W., white, age 22, was brought to my office by her physician October 27, 1911, on account of a swelling of the right upper eyelid at the nasal end which he had treated in vain with various eye washes. Pain which was aggravated by use of eyes in near work and transient diplopia, especially on first rising in the morning, were the only subjective symptoms. Sight normal, each eye. Firm swelling at upper inner angle of orbit. Advised immediate consultation with a rhinologist, whereon her physician took her to Dr. Chas. A. Leavy. A careful study of the nasal condition by Dr. Leavy rendered likely the diagnosis of a malignant growth beginning either in the frontal or ethmoidal cells on the right side. After nearly two months, during which there was a slow but positive increase in the size of the tumor, a gradual increase of subjective suffering as well as a slight decrease in the clearness of vision in the affected side, the patient consented to an exploratory operation. This showed that the process extended from the ethmoid and frontal sinuses back into the orbit too far to permit complete removal without interference with the right eye. Three months later, however, the patient's consent was obtained for a more radical operation. It was then attempted to remove the mass at the upper inner angle of the orbit by removal of the frontal eminence—exposing the frontal sinus—also removing the nasal bone and scraping the ethmoidal sinuses. There was barely a chance that the growth did not extend as deeply into the orbit as it seemed in the exploratory operation, and that the radical removal of these anterior structures with what could be reached of the tumor mass might include really all of it and save the patient's life. She stubbornly refused to have anything done which might imperil the sight of her right eye. The location of the tumor mass made any other procedure impossible. When the outer plate of the frontal sinus was removed, it was found that the inner plate was already eroded and that curettage of the frontal sinus contents showed brain tissue among the fragments. The case was then given up as hopeless so far as the surgical removal of the growth was concerned. The unexpected happened in that the patient recovered with little disturbance from this operative interference. Even the removal of brain substance caused no considerable shock. After consultation it was then decided to administer Coley's fluid. The details of its use will be brought out by Dr. Leavy's records. The effect of its use was to stop any increase in size of the mass. When last seen (September, 1913) she was apparently in excellent health. Her sight was normal in each eye and she had good binocular vision in spite of the injury to right superior oblique by the operation. There is, however, a noticeable deformity (thickening) at the base of the nose and toward the right orbit.

The report from Dr. Buhman on the material submitted for microscopic examination was as follows: Fragments from ethmoid show some bony tissues and a few wandering cells of a suspicious character. Sections from orbit almost entirely malignant new growth, with many giant cells and a few spiculæ of bone. Frontal no new growth. Deep ethmoid, no new growth. Fragments of brain tissue.

Dr. J. M. Smith: The following notes on the treatment in this case with Coley's fluid are copied from the records of Dr. Leavy.

From May 6th to May 30th, sixteen injections were all made into the buttock usually at intervals of one to two days. On the 17th, after the injection of 9 m. there was a rise of temperature of 101°; there was a chill one hour after the injection. After an interval of five days the injections were resumed. By the 30th 15 m. were injected into the buttock with no reaction. All these injections were made with Parke Davis & Co. Coley's fluid. On the 15th of July injections were resumed, using the fluid furnished by Collis P. Huntington, of Philadelphia. Twelve m. were then injected into the buttck and 1 m. intranasally in the growth. Injections were given for five succeeding days until the 19th when 18 m. were injected into the buttock followed by chill and fever of 103°. The gluteal region was much swollen and infiltrated. Treatment was discontinued after five days. Then resumed by the injection of 15 m. in the buttock and 3 m. intranasally in the growth. After three injections, the injections into the buttock were discontinued and the quantity injected in the growth was increased. On August 1st 8 m. were injected in the growth followed by severe headache and fever of 102½°. Injections into the growth were increased until August 8th when patient received 14 m. into the growth, intranasally, followed by severe headache, chill and fever of 103°. Altogether 14 injections were made into the growth. Several times there was hæmorrhage from the nose. On August 10th, injections into the buttock were resumed beginning with 15 m. Eight injections were given into the buttock up to August 24th, on which date 24 m. were injected. The weight of the patient at this time was 119½ pounds, which showed a loss of 14½ pounds during the three and one-half months that the injections had been given. Patient went home and remained there for three weeks with no treatment. Returned very much improved physically, having gained 13 pounds.

On September 16th the injections were resumed with 5 m. in the gluteal region. Three days later 10 m. were given in the gluteal region and 2 m. in the growth. At the same time 12 m. were injected in the gluteal region. This was followed by a chill and fever of 102.5° From September 16th until October 30th, eight injections were made into the growth at intervals of from two days to three weeks, increasing from 2 m. to 4 m. at the last injection on October 30th. On this date 12 m. were injected in the gluteal region and this was followed by a chill and fever of 102.5°. Twenty-eight injections were made into the buttock beginning September 16th and continuing until November 23rd, increasing from 5 to 16 m. at the last injection. Chill and rise of temperature followed several times without apparent special cause. On November 6th following the injection of 15 m. in the gluteal region a most severe hæmorrhage from the nose occurred. The nose had to be packed to stop the bleeding. When the injections stopped, the patient's weight was 142 pounds, a gain of 10 pounds during last two months of the treatment and a net gain of 9 pounds since the beginning of the treatment 5½ months before. Since then the patient's weight has continued to increase and she appears to be doing well in every way.

DISCUSSION.

Dr. Shahan: I would like to ask the doctor if there were any remains of the tumor?

Dr. Loeb: I would like to ask the vision of that eye?

Dr. Luedde: In answer to Dr. Shahan's question, there are still remnants of the tumor in the nose and in the orbital cavity, there is some little thickening.

As to vision, the vision in each eye was 15/12 when last examined.

Dr. Hooss: I would like to ask about the nose bleeding, was it of local origin or from the tumor itself?

Dr. Smith: That was always a local condition. It was slight at times, but sometimes the hæmorrhage was severe and on one occasion it was necessary to pack the nose to stop it.

A Case of Ocular Tuberculosis with Notable Astigmatic Variations.—By Dr. W. E. Shahan.

This paper was published in full in this Journal in the June number, 1913, p. 165.

DISCUSSION.

Dr. Luedde: I was much interested in Dr. Shahan's paper. He has followed the change in the refraction with unusual care. We are sure to find changes in the cornea wherever there is inflammation and swelling in the cornea or the anterior segment of the sclera. I do not think it is important to record the amount of change except to demonstrate that it does occur. We all know that marked changes in the refraction are produced by infiltration and softening of the marginal segments, allowing the center of the cornea to be pushed forward. I have a specimen of such a patient in the later stages showing the gradual thinning of the different layers. In that case the globe was ruptured by a blow. The break in the cornea occurred at the limbus where resistance was least.

Dr. Hooss: Just one point, could it be possible that some of these conditions would be due to the general condition? How do you account for these frequent changes?

Dr. Shahan: The astigmatism was practically all corneal, due to changes in the sclera adjacent to the cornea and in the cornea itself. I feel reasonably certain that the tuberculous process was limited to the eye. His general condition was excellent. During the period of treatment his weight increased about 50 pounds.

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA.

Fourth Annual Session, Chicago, November 10 to 15, 1913.

Dr. Casey Wood, Chairman of the Section of the Congress on the Surgery of the Eye, Ear, Nose, Throat and Oral Cavity, announces a series of operative clinics especially arranged for the large attendance of surgeons that will undoubtedly be present at the approaching Annual Session. In the amphitheatres of the hundred or more hospitals and dispensaries of Chicago, several hundred surgeons can be accommodated, so that it will be possible to give all an opportunity of seeing the important operations already scheduled in the preliminary program. As is well understood, it is not possible for more than a limited number of spectators to view the details of the majority of operations done on the eye and the neighboring organs. This drawback is largely the case in all surgical procedures, but it is probably more pronounced in the measures undertaken by the operators in this section. The Committee is well aware of this difficulty and is making a special effort to overcome it. They propose to adopt such devices as will give the largest possible number of visiting surgeons the best view of the operative field. It is also the purpose of the Committee to correlate operating hours with hospital localities in such a manner as to utilize to the utmost the time at the disposal of members. To this end it will be imperative not only that admission to clinics be by ticket but that this rule be strictly followed. Overcrowding of an operating room always means that no spectator gains an unobstructed or useful view of the work that is being done. The exact mode of distributing tickets will be announced later; it may here be said that it will be a case of "first come, first served."

Lieutenant-Colonel Elliot, F.R.C.S., will demonstrate his method of using the corneal trephine for the relief of glaucoma and, in all probability, a number of other distinguished foreign operators will participate in the actual work of this Section of the Congress—all of which will be announced in the completed program. Meantime, surgeons who practice one or more of the specialties of this Section are invited to be present and to benefit not only by attendance upon the clinics but by listening to the following papers on the evening program:

Operations on the Extraocular Muscles. By Dr. Edward Jackson, Denver, Colo.

Sympathetic Ophthalmia. By Dr. Harold Gifford, Omaha, Neb.

The Surgical Treatment of Suppurative Labyrinthitis. By Dr. Philip D. Kerrison, New York City.

The Indications for the Radical Mastoid Operation with the Steps Essential to Successful Healing. By Dr. F. Whiting, New York City.

The Surgery of the Faucial Tonsil as it Relates to the Functions of the Tongue and Soft Palate in the Production of Voice. By Dr. G. Hudson-Makuen, Philadelphia, Pa.

Peridental Infections, Their Relations to Neighboring Organs. By Dr. V. P. Blair, St. Louis, Mo.

Complete lists of operators with places, days and hours of their clinics in Section of the Eye, Ear, Nose, Throat and Oral Cavity will be announced later.

NEWS.

In the re-organized College of Medicine of the University of Illinois—formerly the College of Physicians and Surgeons, Chicago—the following compose the teaching staff of the Department of Ophthalmology: Casey A. Wood, Professor of Ophthalmology and Head of the Department; Wm. E. Gamble, Associate Professor of Clinical Ophthalmology; J. B. Loring and E. K. Findlay, Assistant Professors. Instructors: Charles C. Clement, Frederick D. Vreeland, Lawrence W. Whitmer, Georgiana Dvorak-Theobald, Herbert Walker and Marie A. Motis.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

ÆTIOLOGY OF PHLYCTÆNULAR INFLAMMATION OF THE EYES.

Z. Belenky-Raskin (*Zeitschrift für Augenheilkunde,* June, 1913) reports the following results of his investigation of 100 cases of phlyctenular eye disease: The cutaneous tuberculin reaction was positive in ninety-two per cent. of the cases; among the children under five years of age the proportion was eighty-five per cent. The cases in which the reaction was negative do not justify the assumption that the phlyctenular inflammation of the eye is due to some other disease than tuberculosis, for some of the negative cases showed positive clinical signs of tuberculosis. He finds no ground for attributing the eye condition to autointestinal intoxication since indicanuria is not specially frequent. The fundamental tuberculosis demands attention in every case, in addition to the usual local treatment of the ocular lesion.

PREVENTABLE BLINDNESS—A CHALLENGE TO THE PROFESSIONS.

Henry Copley Greene (*Jour. A. M. A.,* September 27, 1913, Part 2) presents facts which he thinks justifies this conclusion:

The problem of unnecessary blindness, which has so largely baffled and sometimes even disgraced the professions of medicine, business, statecraft and social service, demands for its solution the following measures:

1. A campaign of medical and lay research and education, government action, medical treatment and social work carried on, wherever possible, to limit and to remedy ocular disease, especially the more prevalent and damaging diseases and defects.
2. In the work of public education, special stress to be laid on the importance not only of ophthalmia neonatorum and trachoma, as causes of blindness, but also of glaucoma, syphilis and ocular injuries.
3. Medical schools to emphasize the interrelation of ocular and general disease, to teach their students the importance of

consultation with ophthalmologists and a high sense not only of human service but also of the physician's duty to uphold the health laws, both national and state.

Hospitals and clinics urged to provide ophthalmologists with every possible facility for the diagnosis and treatment of obscure cases, including the help of pathologists, syphilologists, brain specialists, Roentgen-ray specialists, and others.

4. The prevalence of blindness studied in each state in relation to its more prevalent causes, on a basis of reports of cases of blindness to state commissions or other central agencies.

5. To promote such intelligent study of the prevalence and results of eye diseases, a committee of the American Medical Association to request hospitals and ophthalmologists to include in all their eye records the following data: age; sex; single, married, widowed or divorced; birthplace; birthplace of parents; occupation or school grade; in possibly syphilitic cases, the number of children, still-born, dead or living, and in traumatic or possibly traumatic cases, the tool or machine used, and the manner of injury.

6. To facilitate the comparison of results the following standards of vision officially adopted: for blindness, the German standard, vision fingers 1 foot or less; practical blindness, vision less than 20/200 with glasses; partial disablement, vision 20/200 to 20/50, inclusive, with glasses.

7. Making it the duty of the state boards of health or of special private agents to study the needs of all localities; and in co-operation with medical schools and hospitals, to bring to the notice of young ophthalmologists opportunities for work in places especially requiring their services.

In remote districts, where peculiar conditions require it, such clinical expeditions as those of Dr. Stuckey in the Kentucky mountains.

In large cities, self-supporting evening clinics, with paid ophthalmologists in attendance, organized to compete with charlatans and inefficient practitioners and to provide self-respecting patients on low wages with facilities for expert treatment otherwise hard to secure.

In clinics and hospitals, the specialist's work made more efficient by insisting on proper treatment of diseases underlying local eye symptoms and by keeping patients under treatment long enough to get results.

8. Paid social workers made part of the regular staff of all eye clinics so as to increase their efficiency in the prevention of blindness from glaucoma, uveitis, etc., and to economize the work of the physicians in charge, as fast as the necessary funds can be secured.

9. In schools, the pupils' eyes regularly examined, preferably by trained physicians; records kept showing the effect of the school curriculum on eyesight, and parents induced or compelled to furnish necessary eye-glasses or treatment for the eyes. If necessary, the state "neglect law" amended to make this possible. In the management of institutions, state and local authorities to set a standard of work for the preservation of eyesight.

Especially in reform schools and prisons, in which the inmates are shut away from the usual medical facilities, ophthalmologists regularly in attendance; and close co-operation secured between ophthalmologists, general physician and the probation officers having oversight over discharged prisoners. All male gonorrhœal, and all syphilitic patients detained until cured.

10. Classes, especially adapted for children with defective eyesight, organized in all large cities, not only to provide education for children not properly inmates of institutions for the blind, but also to aid in the preservation of their sight.

School children with the vision of both eyes defective, or with one eye practically blind, guided toward occupations relatively free from ocular injuries.

11. State birth registration laws amended to secure birth notification within three days, and preferably within forty-eight hours; and warnings as to the danger of ophthalmia neonatorum sent to all mothers immediately on receipt of birth notices.

Obstetric clinics promoted to furnish adequate nursing and medical service to the poor in large cities. Midwives trained, registered and supervised in cities in which their services are necessary.

A suitable prophylactic distributed free to all physicians and to midwives. The use of this prophylactic required at all births in lying-in hospitals or in the practice of midwives, and at least recommended strongly to physicians.

The symptoms of ophthalmia neonatorum defined by the American Medical Association as redness and swelling of the eyelids and unnatural discharge from the eyes, within thirty days of birth, and made reportable by physicians as well as nurses and parents.

Physicians, as well as midwives, prosecuted whenever necessary to secure observance of the reporting law; and physicians admonished by their state societies for failure to obey the law or to secure adequate treatment and nursing for serious cases.

Local boards of health given ample powers over reported cases, subject to the supervision and control of the state boards in requiring adequate standards of treatment. Minimum requirements defined by the American Medical Association as the attendance of an ophthalmologist, or of a physician experienced in the treatment of ophthalmia neonatorum, assisted in all but the lightest cases by at least one trained nurse.

12. Trachoma made reportable in all states in which it is prevalent, proper treatment insured under public supervision, and in case children are affected, special schooling provided.

13. Workers for conservation of vision to join with associations for sex education, etc., (*a*) in setting adequate standards of treatment for syphilis, congenital and acquired; (*b*) in raising the physical standards of marriage, and (*c*) in urging the federal government to extend to syphilitic patients the system of exclusion *at the port of embarkation,* now applied to emigrants with trachoma.

14. Legislation against holiday injuries, etc., and popular education as to the dangers of non-industrial injuries of the eye.

Co-operation with both employers and employes in the elimination of industrial injuries.

Team-work with the American Association for Labor Legislation, to secure the enactment or amendment of factory inspection and workmen's compensation laws, so as to provide for study of industrial conditions affecting eyesight, protection from injury and disease, and special compensation, not merely for "total and irrecoverable blindness" of either or both eyes, but also for practical blindness, defined as reduction of vision to one-tenth of normal with glasses.

15. A joint committee of the American Medical Association and the existing state organizations for the prevention of blindness and the conservation of eyesight to provide for interchange of information through periodic reports from each state, published in ophthalmologic journals and the *Outlook for the Blind,* and as soon as any vital demand is manifest, to promote a federation of all state committees and commissions actively at work for the preservation of eyesight.

TRACHOMA AMONG THE INDIANS.

J. W. Schereschewsky (*Jour. A. M. A.*, September 27, 1913, Part 2), an officer of the Public Health Service which made an investigation as to the prevalence of certain infectious and contagious diseases among the Indians in the United States, reports the results of the investigation with regards to trachoma. Of the 39,231 Indians examined in twenty-five different states, 8,940 of them, or 22.7 per cent. were found to have trachoma. If this same rate prevails for the entire Indian population of the United States there are some 72,000 cases of this disease among these people. The disease was found to be most prevalent in the Indian boarding schools, 29.86 per cent. of the inmates of 133 of these schools being infected. In the Indian day-schools many cases were also found, 21.55 per cent. of such pupils examined being found suffering with the disease. Of the reservation Indians examined, 17.2 per cent. were found to be infected, a distinctly lower percentage than was found in the schools. Practically all ages were found represented in those afflicted thus, several cases being found in infants under one year of age. From observations and information given the officers, there can be no doubt but that the disease has been among these people for at least a generation, it being impossible to say just how long. Many cases were found where the vision had been markedly damaged by the usual complications of this disease, quite a number being blind in one or both eyes. The unsanitary housing conditions and want of knowledge of personal hygiene among these people is without doubt responsible for the wide dissemination of the disease among them. In the present wide-spread diffusion of trachoma among the Indians the author sees a serious menace to future white populations of Indian reservations.

EXPERIMENTAL STUDY OF INTRA-OCULAR PRESSURE AND OCULAR DRAINAGE.

Mark J. Schoenberg (*Jour. A. M. A.*, September 27, 1913, Part 2), in summarizing his article, says the study of the ocular drainage has revealed the following:

1. There is always a gradual reduction of intra-ocular pressure if the tonometer is applied on a normal eye for a certain number of seconds.

2. The rate of reduction of intra-ocular pressure varies not only in various eyes, but also in the same eye if taken at different periods.

3. Experimental evidence seems to indicate that changes of intra-ocular pressure in one eye may often be followed by similar changes of intra-ocular pressure in the other eye.

4. Neither the experiments on rabbits and cats nor the examinations in the operating room give any clue regarding the existence of a reflex or biochemical action starting from some distant region and influencing the intra-ocular pressure. The extra-ocular muscles play an important role in the various normal fluctuations of the intra-ocular pressure.

5. The ocular drainage in glaucomatous eyes differs from that of normal eyes. The slower the rate of drainage, the nearer the eye is to an acute attack or to absolute glaucoma; the more rapid the rate of drainage, the nearer to a state of compensated glaucoma. *A reduction of the rate of ocular drainage may mean latent glaucoma in spite of an intra-ocular pressure which is within the normal limit* (*below 26 mm. Hg.*)

The continuous fluctuations in the intra-ocular pressure and ocular drainage in normal eyes, the relative dependence of the intra-ocular pressure on the general blood-pressure, and of the latter on the ductless glands, and the probable relation existing between the intra-ocular pressure of both eyes, suggest that the present tendency of devising all possible operative procedures for the relief of intra-ocular pressure in glaucoma is only a palliative measure. It is not logical. The essence of glaucoma is not an increased intra-ocular pressure just as a high blood-pressure is not the essence of arteriosclerosis.

THIRTEEN CASES OF HEREDITARY TRANSMISSION OF RETINITIS PIGMENTOSA IN TWO GENERATIONS.

George H. Oliver (*The Ophthalmoscope,* July, 1913) reports the case of a woman with retinitis pigmentosa who had three daughters and one son, all of whom had this ocular condition. The first daughter had two sons and three daughters, one son and two daughters having the same disease. The second daughter had two sons and three daughters, one son and all the daughters being afflicted with the disease. The third daughter died unmarried. The son had three sons and three daughters, two sons having the eye trouble. So far as the author was able to learn none of the original case's ancestors or brothers or sisters were afflicted with the disease.

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ORIGINAL ARTICLES.

A RARE CASE OF BILATERAL OPTIC NEURITIS.

By C. Barck, M.D.,
ST. LOUIS, MO.

Patient was a lady, 32 years of age. She is of middle size and fairly well nourished. Her general health has been good for the last decade or more. She has been married for 12 years and has three children. When she was pregnant the first or the second time (she cannot recollect the number definitely), her vision became impaired and remained so for some time. But it was not considered important enough to call a physician, and the vision returned spontaneously. Since then she enjoyed good sight until lately. The memory of this incident, of the patient as well as of her husband, is rather meager.

When seen for the first time, on the 7th of April, 1913, her vision of the right eye was reduced to hand movements. The left eye was absolutely blind. According to the history given, she did her household work and was able to read as usual on the 2nd of April. On the 3d and 4th she had some vague headache and some fever (?); and took some family medicine. When she woke up on the morning of the 5th she found that her left eye had become blind. The following day the vision of the right eye failed rapidly, and on the 7th was reduced to the state mentioned.

Examination.—Pupil of right eye ad maximum dilated. Very slight response to light. When the ophthalmoscope is used, the pupil contracts to a circle of 6-7 mm. diameter. Patient is able to recognize the movements of the hand at a distance of about one foot; the perception is confined to the central portions of the field. Media transparent. The fundus was found normal, with the exception of a moderate dilatation of the retinal veins upon the optic disc.

The pupil of the left eye was likewise ad maximum dilated and was immobile. Even the ophthalmoscope did not provoke the slightest contraction. There was no perception of light. In the fundus of this eye the typical picture of neuritis optica was present. The disc infiltrated and swollen; the veins congested and tortuous. Yet the degree of the changes was a moderate one.

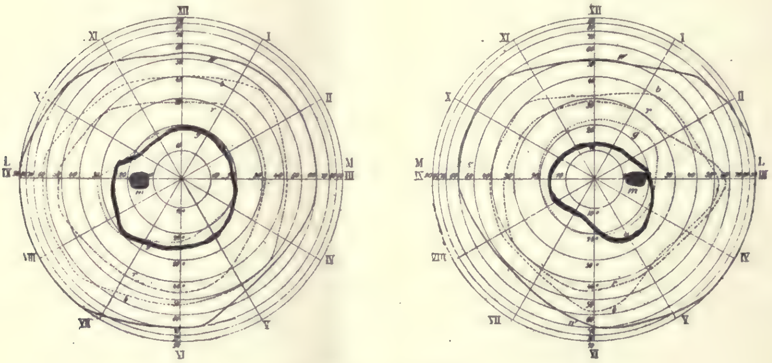

Fig. I. April 26th.

The temperature was normal; and there was never an elevation of temperature during the entire subsequent course of the affection. Patient had no more headache, or pain anywhere else. Only movements of the eyes to the extreme limit were accompanied by slight pain. The urine was free from albumen as well as from sugar. It was regularly examined hereafter with the same negative results.

The closest inquiry into the possible causal factors did not reveal anything. Heredity was denied. There was no local disease in the orbit or in the sinuses of the neighborhood. There was no acute febrile affection (the statement, that she had fever on the 3d and 4th, must be taken cum grano salis). Syphilis, diabetes, albuminuria, anæmia, chlorosis, could be excluded. There was no clue for poisoning by lead or any other substance. Intra-cranial symptoms were altogether wanting. The only possible factor discovered, pointed to the uterus. The menstruation was overdue one week. Therefore the possbility of an incipient pregnancy had to be taken into consideration.

The patient was immediately sent to a hospital. The treatment consisted mainly in rapid mercurialisation; and sweating, induced by pilocarpine injections and the internal use of the salicylates. Furthermore, Dr. S., obstetrician, was called into consultation. He took measures to bring forth the delayed menstruation, by hot douches, ergot, etc. The aspect of the case was so serious, that such measures were certainly justified.

The subsequent course was as follows: The general health was excellent. Patient had never any pain or headache, slept well, enjoyed good appetite. In spite of the anything but pleasant condition and doubtful prognosis she was always cheerful and hopeful. The vision of the right eye decreased steadily and on the 10th this eye had also become entirely blind, and the reaction of the pupil to light was lost. Upon convergence there remained a slight contraction of both pupils during the full period of blindness. The intra-ocular symptoms of neuritis manifested themselves now in this eye, whilst the neuritis of the left had increased. Throughout the following week it continued to increase in both eyes. But the swelling of the discs never reached a high degree, such as we find it in choked disc. It was measured a number of times and the difference between the height of the swelling and the adjacent retina was never found to be more than 1½ to 2 diopters; giving an elevation of about ⅔ of a mm. Furthermore, the changes were confined mainly to

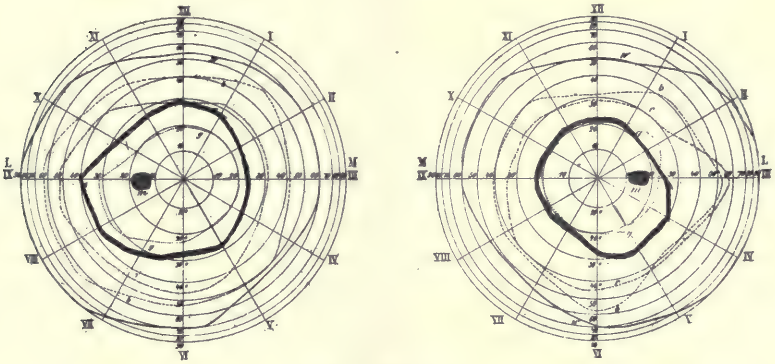

FIG. 2. May 2nd.

the disc; they did not reach far into the retina. With the exception of the immediate neighborhood of the disc, the retina was normal. it is evident that we had to deal with an inflammatory process of the optic nerve within the orbit, of which the terminal (intra-ocular) symptoms were not very marked.

On the 14th the menstruation commenced; there was a scant flow of blood. Orders had been given, to collect and preserve the discharge for closer examination. Unhappily the nurse forgot the order, and the soiled linen was thrown into the wash. For some days the menstrual flow continued, but it was never strong.

The complete bilateral blindness lasted until the 18th. On this date the pupil of the left eye (the first affected) showed some response to light, when tested with the ophthalmoscope. Patient experienced then also a faint perception of light. On the 19th the pupil of the left eye responded better and that of the right eye showed also some reaction. From now on there was a slow but steady recovery of both eyes. The steady improvement of the central vision is best given by a copy of my notes:

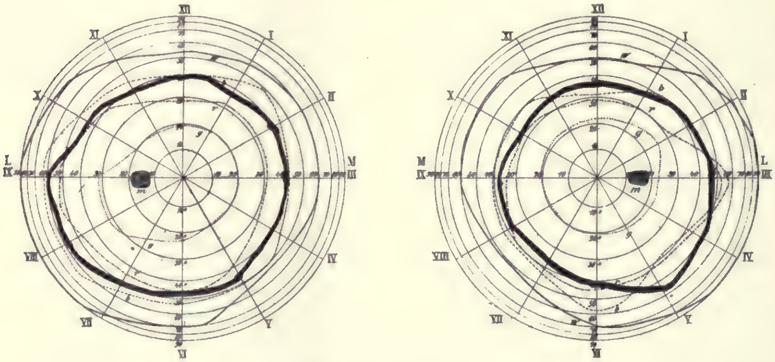

FIG. 3. May 12th.

April 20. Perception of light in R.; hand movement in L.

April 24. Both pupils smaller; reaction quite prompt.

April 25. Leaves hospital.

April 29. The swelling of the optic discs subsided gradually; and to-day there is nothing abnormal visible in the fundi, except a slight infiltrate around the veins of the disc. Vision=1/120, each eye.

May 3. Fundi may be pronounced normal. V. R.=6/120; L. =6/60.

May 5. R.=6/60; Snellen none. L=6/24; Snellen VIII.

May 8. R.=6/24; Snellen X. L.=6/12; Snellen IV.

May 10. R.=6/15; Snellen IV. L.=6/12; Snellen II.

May 12. L.=6/12; Snellen III. L.=6/9; Snellen I with difficulty.

May 15. R.=6/9; Snellen II. L.=6/7; Snellen I.

May 24. R.=6/7; Snellen I w. d. L.=6/6; Snellen I.

Dismissed.

There was never a central scotoma. On the contrary, the fibres of the macular bundle were the first ones to recover; the central vision was always by far the best. The field of vision was at first very small, but concentrically contracted; it increased slowly and in the same ratio as the central vision; as shown by the accompanying charts.

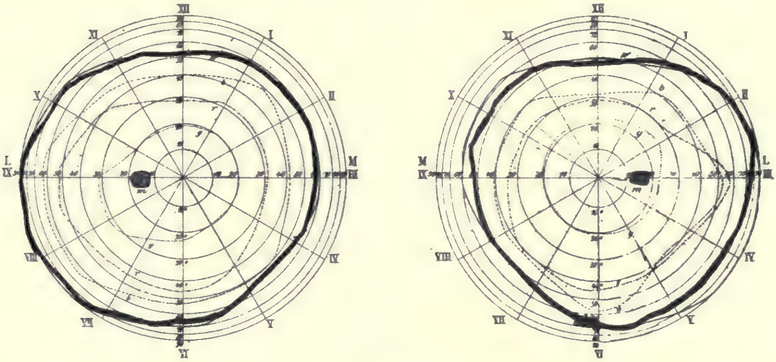

Fig. 4. May 24th.

The color perception was very poor for some weeks after the vision had commenced to improve. It affected all colors uniformly. In the beginning of May no color could be recognized; all looked alike to the patient. Differences of brightness were distinguished first. By and by the main colors, red, blue, green, yellow, could be made out; and apparently their recognition came at about the same time. There was certainly no red-green blindness. These two colors could be distinguished from each other as soon as any other.

As seen from the data, the right eye had been entirely blind for 13 days and the left eye for 10 days. I am unable to find in literature a case where blindness due to optic neuritis lasted that long and where restoration of vision took place; for this reason I considered the case worthy of publication.

In my opinion we had to deal with an inflammatory process, which involved more or less the entire optic nerve. It certainly began as a "retro-bulbar" neuritis; this term being used here in its correct sense. Unhappily the nomenclature of diseases of the optic nerve leaves much to be desired; especially, since the term retro-bulbar neuritis had been introduced to designate the toxic amblyopias. It ought to be restricted to really inflammatory diseases and not to atrophies produced by poisons.

As to the cause of this severe neuritis, I still believe that the condition of the uterus was more or less responsible. Conclusion *a posteriori,* because improvement of vision set in, after the menstrual flow had commenced, seems to strengthen this assumption. The question, whether we had to deal with delayed menstruation, or with incipient pregnancy, must remain an open one, as the material, on the basis of which this question may have been decided, had disappeared. Without such positive proof Dr. S. did not want to decide the question one way or another.

A NEW METHOD OF DELIVERING THE LENS IN ITS CAPSULE.*

By A. E. Ewing, M.D.,
ST. LOUIS, MO.

In removing a piece of the anterior capsule of the lens with the capsule forceps, one now and then happens on an intracapsular extraction, probably because of a tough capsule and a weak zonule. Also, one blade of the forceps may slip back of the lens margin. Such an instance was mentioned in an article entitled "Mandible Forceps" (*Am. Journal of Ophthalmology,* May, 1913,) in which the healing was rapid, the pupil was clear and the visual result was normal. This lack of iritic irritation and this prompt healing of the corneal wound accords with the usual experience in cases in which the lens is removed in its capsule, as well as in cases in which the capsule has been ruptured and the cortex has been thoroughly removed, and is the strongest evidence that the ideal method of extraction would be the intra-capsular, as it would eliminate the risk attending swelling cortex, as well as that connected with secondary membranes, provided it may be accomplished without injury to the adjoining vitreous, and without too greatly disturbing the attachment of the suspensory ligament in the ciliary region. Unquestionably Daviel extracted many lenses in their capsules, and from then until now the methods of accomplishing this result have had earnest advocates; yet no method has been devised that is so free from danger as to cause its universal acceptance by the safer and more conservative practitioners, a large majority of whom do not even attempt it because of the great risk.

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*Read before the St. Louis Ophthalmological Society, Nov. 24, 1913.

Of the three methods now ordinarily employed, the one usually resorted to is that by expression, in which, following the corneal section, and the iridectomy, the lens within its capsule is forced from the eye by external pressure applied near the corneal margin opposite to the corneal incision. A modification of this method is to catch the lens capsule with forceps, rotate the lens on its antero-posterior axis, and then remove it by expression. Another modification is to pass a hook down in front of the lens, rupture the zonule at the lower border, remove the hook and extract by pressure.

The second method is to pass a cataract spoon or a loop behind the lens and remove the lens in its capsule by gentle traction. Often the procedure is aided by pressure on the cornea.

The third method, recently suggested by Hulen, is to place a suction instrument on the capsule in the pupillary area, exhaust the air and remove the lens by traction, or by traction and expression.

Possibly other reasonably safe methods by traction, or by traction combined with expression, may be executed by employing the following described instruments, the common form for the handle of which is shown in Fig. 1, A. The base consists of a forceps handle, to which two shafts, *a* and *b,* are attached, one to each limb of the forceps. These shafts connect at the end of the handle by two cogwheels, *c,* so arranged that when one of the shafts is rotated the other will rotate in the opposite direction. Attached to one of the shafts is an adjustable spring, *d,* and in a convenient position also a small short arm, *e,* which is controlled by the forefinger. To prevent the forceps opening wider than is necessary a small stop, *f*, is provided.

The points for the rotating shafts may consist of loops, spoons, fenestrated spoons or hooks. By means of the rotating shafts and the finger control, any of these different forms of points may be made to assume any of the principal positions represented by 1, 2 and 3 in diagrams B, C and D in the accompanying illustration, Fig. 1, as well as all intermediate positions. The spring adjustment aids in rotating the tips to any desired position and retaining them in this position until it is changed by the direction of the forefinger. In the case of the hooks, they are first adjusted by means of the spring, so they will set to hook the lens at its lower margin. With the forefinger on the arm *e*, they are turned sidewise, in which position, with the forceps closed, they

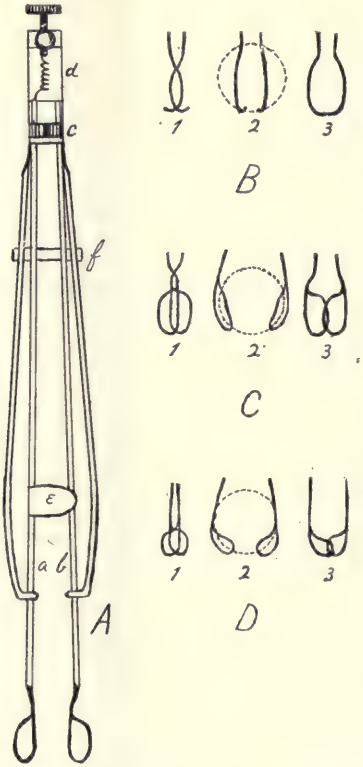

Fig. 1. A new method of delivering the lens in its capsule. Illustrations of instruments that may be employed.

are introduced between the iris and the lens to the lower lens margin. The finger then releases the arm *e* and the hooks are brought into the desired position to grasp and withdraw the lens, while the thumb and middle finger on the limbs of the forceps separate the hooks to any desired distance. When the lens has presented itself beyond its equator in the wound, the hooks may be returned to their sidewise position by the forefinger, so as to do no injury to the vitreous, or to the margins of the corneal wound, or to the iris. This is the ideal. Practically I find that the hooks hang and cause trouble when employed on the eyes of animals. I have not tried them on the human lens.

The loops are managed in a similar manner to that of the hooks. Each loop is constructed with a shoulder, the purpose of which is to pass backward around the edge of the lens when the spring is released. The forceps are then closed; by gentle traction the lens is dislocated and coaxed into the corneal wound, and when it is half way through the wound the loops may be returned by the forefinger to the first or third position, preferably the first, in order to avoid rupturing the vitreous.

Judging from trials on the eyes of animals, this seems to be a practical instrument, and employed in this way the method seems to be practical. Also the instrument works well in the half or the one-third size, possibly better than in the full size. In this smaller size it grasps the lens at its lower border on either side, and the shoulder of the loop does not interfere as the lens starts on its passage through the wound, as may occur with the larger size.

These instruments are also applicable in cases in which the lens has been dislocated into the vitreous.

TRANSLATIONS.

DOES THE CORNEA NOT PARTICIPATE IN THE ABSORPTION OF THE AQUÆOUS HUMOR.*

By Dr. C. Hamburger,
BERLIN.

(Translated by Adolf Alt, M.D.)

During the discussion on von Szily's paper at this year's Heidelberg Ophthalmological Congress I showed a microscopical specimen in which Descemet's membrane, at least the nuclei of its endothelial cells, were stained blue *intra vitam.* The staining resulted from an injection of sodium indigo-sulphate into the auricular vein of a living rabbit. The enucleation of the absolutely untouched and absolutely healthy eyeball was made about a quarter of an hour after the injection. Not a trace of blue was found in any other part of the eyeball.

An observer, well versed in microscopical technique, said that he had never seen this extraordinary selective staining of Descemet's membrane *intra vitam,* and in the references to my demonstration a slight doubt always was expressed.

If this was an affair of little interest, it might be just as well to say nothing further about it. We have, however, to deal with an important question in the physiology of nutrition of the eye; for a staining material which, when introduced into the blood, is already after so short a time stored in Descemet's membrane of the untouched eye, can have come there probably only by way of absorption after having by secretion been mixed with the aqueous humor in a minute quantity. To my thinking this procedure proves that the cornea, also, is an organ of absorption; and this observation, if it is correct, is of no inconsiderable importance because it is opposed to the common opinion expressed in every textbook on physiology, according to which the cornea has nothing whatever to do with absorption.

Yet, the observation *is correct.* I cannot only state that this specimen, which I stained in Hertwig's laboratory, was demonstrated at Heidelberg and was examined by experts at Berlin; but in order to exclude all misunderstanding I want now to make known the exact manner in which I obtained it. The illustration can be found in the report of the Congress (and perhaps in a comprehensive work on the present knowledge of the nutrition of the eye which I hope to be able to publish in about a half a year).

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*Klin. Mtsbl. f. Augenhlk., September, 1913.

(1) Whoever wants to see how easily a 2 per cent. solution of sodium indigo-sulphate penetrates into the cornea, iris and the nuclei of Descemet's endothelium, needs but to introduce a small quantity of it into the anterior chamber. A half or three quarters of an hour later the eye is enucleated and put into absolute alkohol, or, what is more preferable, right after death absolute alkohol is brought into the eye by means of injection from the heart. (cf. Hamburger, *Klin. Mtsbl.,* 1910, p. 60. The shrinking of the tissues is more certainly prevented by injection from the heart.)

(2) The staining of the inner surface of the cornea is much more brilliant by way of the bloodstream. A large rabbit weighing about three kilograms has forty to fifty ccm. of the 2 per cent solution within half an hour slowly infused into the femoral vein. Small animals are not appropriate because they bear in proportion much smaller quantities only, and die not uncommonly in spasm just after completion of the successful injection. After this, Descemet's membrane is found to be plainly blue. However the bloodvessels of the iris, also, are well stained and those of the ciliary body slightly according to the regions where the staining material was secreted, for it has a great affinity to the bloodvessel walls. When smaller quantities are injected besides the membrane of Descemet, as is well known, only the walls of the iris bloodvessels and not those of the ciliary body show any blue tint.

(3) The most brilliant way, however, is to work with minimal quantities of the staining material, so that neither iris nor ciliary body shows any blue parts while the posterior surface of the cornea alone is colored. Such an isolated staining was obtained by injecting 1.5 ccm. of the 2 per cent. solution into the auricular vein of a small animal weighing only 340 grammes. The eye was enucleated about one quarter of an hour later. The lens of this young rabbit in spite of being embedded in paraffin was so soft that its peripheral parts, at least, could be cut into sections.

All experiments on the eye with sodium indigo-sulphate are somewhat uncertain, even when all precepts as to quantity are observed in the strictest manner. (Ernst V. von Knape, in the *Scandinavian Archives for Physiology,* 1911, XXIV, p. 259 to 320, who repeated my experiments, makes this statement, too, using almost my own words. However, Knape does not seem to have made any studies of the staining of the endothelium of Descemet's membrane.) The experiments mentioned under (1) are easily the most successful; those under (2) miscarry now and then; those under (3) are very delicate and are of the most difficult experiments to perform that I know of. I shall very gladly show doubters the specimens I possess.

Trypan-blue can, also, be used to produce from the blood an intra-vitam staining of the posterior surface of the cornea, but this is not isolated; the lens capsule is, also, stained blue, most intensively at its æquator.

Ulrich reported a similar result in his, as it seems to me, altogether too little valued papers "On the nutrition of the eye" (*von Graefe's Arch. f. O.,* 1880, Vol. XXVI). This was obtained by the subcutaneous injection of ferrocyanate of potassium and fixation of the eyeball enucleated four hours later in alkohol containing ferric chloride.

Isolated staining of Descemet's membrane from the blood, showing an absorption by the cornea, can be successfully produced only with indigo-sulphate of sodium, at least, as far as I know.

SARCOMA OF THE UVEAL TRACT,

INCLUDING THE EXPERIMENTAL RESEARCH CONCERNING TUMORS AND THE MODERN VIEWS ABOUT THE HISTOGENESIS OF TUMORS.*

By Dr. O. Lange.

(Translated by Adolf Alt, M.D.)

On January 3d, 1907, I was consulted by a 57 year old woman on account of her right eye, which had been injured 9 years previously while threshing, suffered from ulcus serpens and become phthisical. Until 1902 the blind eye had caused no suffering. In November, 1902, without known cause, the blind eye became painful, but the irritation disappeared soon and the eye remained quiet till 1906. In August, 1906, the patient saw on the surface of the still painless eye a black spot, which grew rapidly and bled easily. Then the eye became again painful. By November the black spot had grown greatly and protruded as a black, easily bleeding tissue mass between the lids; the pains grew more and more severe, till they became unbearable. Patient says that she lost flesh rapidly during the last six months and feels very miserable.

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*Klin. Mtsbl. fuer Augenhlk., October-November, 1913, p. 537.

The examination of the very badly looking, emaciated woman showed a tumor which had perforated the temporal corneoscleral margin, was the size of a plum, pigmented, covered with crusts and bleeding. This could only be looked upon as a sarcoma. From the general protrusion and the lack of motility in all directions, I had to conclude that the intraocular tumor had perforated the eye backwards into the orbit, also. Since the examination of the internal organs did not show any metastases—the liver was not enlarged and was smooth, no cough, urine normal, indican not increased, no black sediment after prolonged standing in the light—I decided to make a subperiosteal exenteration of the orbit, having told the family of the meagre chances of a lasting cure.

On January 9th I performed the operation, and found the optic nerve perfectly black back to the foramen opticum osseum, so that I could not operate in healthy tissue but had to leave black tumor masses in the depth of the orbit, which I tried to destroy with the Paquelin. Under these circumstances I expected to see a local recurrence in a very short time. Instead, the large wound surface healed without any accident and the patient could be discharged in very good condition on February 15th. I kept a watch on her and was not a little astonished and pleased when I heard from her again and again, that she was doing well. When I saw her in December, 1911, about 4 years after the operation, she was apparently perfectly healthy and had no complaints. Her weight had increased considerably, her color was good and she could do all her work.

On May 14th of this year, that is 6 years and 4 months after the operation, I have seen her again. She stated unasked that she was perfectly well, except that she had lost flesh within the last year. The orbit shows a firm white scar with nothing suspicious of a tumor. The internal organs are in a normal state, urea without albumen or sugar, no headache. She does all her work. The other eye is perfectly normal.

It is not exactly wonderful that 6½ years after this absolutely incomplete operation no metastasis have shown themselves in the inner organs, since they often appear only after 8, 10, 15 years and more. However, it surely does not happen frequently, as in my case, that although plainly visible, black tumor masses were left in the orbit no local recurrence had formed after 6½ years. On page 273 of his well-known book on the sarcoma of the uveal tract, Fuchs says: "Regarding the prognosis we have to deduct 8 cases (among 243 cases) in which the operation was incomplete or not done at all." He thinks, then, that as a matter of course a local rceurrence must occur after an incomplete operation. In his tables, which include completely operated cases only, the local recurrences came on most frequently within 6 months, but sometimes much earlier, even within one week after a complete operation. A few weeks after the case just related, I had to exenterate the orbit in another individual in whom a local recurrence happened only 11 days after, although I felt confident I had removed everything.

In the case described above the conditions were apparently extraordinarily favorable for a rapid local reccurrence, since, as the microscopical examination showed, we had to do with a very vascular, darkly pigmented, large cell spindle-cell sarcoma, partly alveolar, which I was forced to remove but incompletely. Yet, there was not a trace of a recurrence 6½ years later. It will be difficult to explain this satisfactorily, although based on the miscroscopical findings we were convinced that larger parts of the retrobulbar tumor, especially, showed signs of necrosis on account of the excessive pigment formation in the cells which appeared as totally black, non-transparent round bodies, while a great deal of pigment lay free in the tissue. The largest part of the tumor consisted of large, more or less pigmented spindle cells, without signs of necrosis. This was the case, also, with the parts lying at the apex of the orbit and having invaded the posterior parts of the optic nerve. I do not think it possible that with the Paquelin I destroyed all the pathological tissue in the depth of the orbit and in the optic canal. I, therefore, note the fact of the local non-recurrence after 6½ years of a sarcoma of the uveal tract in the third stage which I had removed incompletely.

Wintersteiner, to whom I wrote about this observation, answered me that no such case was to be found in literature, but that he himself had had a similar experience:

"Enucleation on account of atrophia dolorosa. At the microscopical examination I found a sarcoma of the choroid which had already perforated the sclera posteriorly. In the microscopical sections it is plainly seen that the retrobulbar nodules were cut by the scissors, therefore part of them was left behind. In spite of this no local relapse. Death occurred thirteen years later from phlegmone of the larynx. Enormous metastases in the liver, one as large as a hen's egg in the meninges of the frontal lobe. Contents of the orbit free from tumor, microscopically, too."

Wintersteiner could explain his observation as little as I could mine. P. Kerschbaumer, in her book (Sarcoma of the Eye, p. 298) reports an oral communication of H. Sattler, according to which he found in an enucleated phthisical eyeball a sarcoma which had perforated the sclera backwards and immediately performed exenteration of the orbit. For seven years no local relapse appeared. Then von Schroeder reported the following case from the St. Petersburg Eye Clinic (reviewed in the *Centrlbl. f. Aughlk.*, 1892, p. 285):

"Woman, 28 years old, with sarcoma of the right eye. T+3; V=0. On March 14th, 1891, enucleation. The tumor had perforated the sclera backwards, had grown upwards along the optic nerve and formed numerous disseminated nodules in the orbital tissue. These were removed with knife and scissors, as completely as possible; however, the examination with the finger showed that numerous minute tumors were left behind. The nerve, also, could be felt in the depth as a hard tumor-like mass. Dissection of the globe showed a large melanotic tumor of the choroid. Expecting an early local relapse the orbital cavity was powdered over a number of times during the following two weeks with pure blue pyoktanin. The wound healed with a clean scar in two weeks and the general condition improved. No local relapse a year later."

Von Schroeder is inclined to ascribe the favorable result to the pyoktanin and recommends its use in similar cases. In his book, page 275, Fuchs mentions a case in which at the time of the operation the primary tumor protruded out of the eye like a plum. Two years later two little tumors were removed from the orbit and three years later again a small nodule. Three years after this no further local relapse had occurred. In the *St. Petersburg Medical Weekly* I have reported (1881, p. 335) two cases of primary pigmented fibrosarcoma of the orbit, which I had removed as well as possible without sacrificing the eye (Kroenlein was not known then). Although in both cases parts of tumor undoubtedly remained in the orbit, local recurrences did not appear for several years after. Similar observations were recorded by Walther and Stoeber. In the February number of 1894 of this paper, I again discussed these orbital cases prompted by Berlin's doubt of the correctness of my diagnoses, and added accurate drawings of the specimens made with Winkel's drawing prism.

In contrast to this peculiar, but rarely observed and with difficulty explainable, behavior of a choroidal sarcoma in the third stage, I want to refer to the fact that, as is not rarely seen, small and smallest sarcomata absolutely confined to the choroid in spite of the earliest and apparently most radical removal by enucleation, will soon after the operation cause death by metastases in the inner organs. Such a case, which I shall never forget, I saw during my service at the St. Petersburg Eye Clinic with my chief, Dr. Magawly:

The patient was a lady, in the twenties, in whose left eye near the macula lutea a small grayish tumor mass was found, which was about 1½ disc diameters, large and protruded into the vitreous body for about 1½ mm. There was a corresponding central scotoma in an otherwise free visual field and an eye absolutely free from irritation. Magawly and I, who had seen the case separately, agreed that it could be nothing but a small pigmented choroidal sarcoma. Hardly a year after the enucleation the patient died from sarcoma of the liver.

The dissection of the eye proved our diagnosis correct, but a microscopical examination could not be made since the eyeball in an unaccountable manner disappeared.

A second similar case I have seen here in Brunswick in an enormously strong and healthy looking man, 32 years old, in whose left eye I had diagnosed a choroidal tumor about 4 mm. long, about 5 mm. broad and about 3 mm. high. Dissection of the enucleated eyeball proved the diagnosis correct and the microscope showed a lightly pigmented alveolar sarcoma. Although the tumor was apparently completely removed, since, as the microscope showed, it had nowhere grown beyond the choroid, the patient died about 9 months later from a metastasis in the brain.

On page 277 l.c., Fuchs says that metastases appear almost always within the same period of time, whether the tumor was removed early or late. In F. Baudouin's dissertation *"Du sarcoma mélanique du tract uveal,"* Paris, 1897, L. Championnière's opinion is given, which he expressed in discussing the prognosis: "Operate as soon as you please; the result is always fatal." He sees in the melanosarcoma of the uveal tract a thing to be left untouched, and says further on: "I have also noticed that whip-like the operation seemed to arouse the disease and provoke a quick relapse. I am for keeping as far as possible away from a radical intervention in melanosarcoma."

On page 488 of Vol. II, Traité complet d'ophtalmologie of de Wecker and Landolt (1886) we read: "It is probable that if we could more often observe a choroidal melanosarcoma from its beginning, we should become convinced that its course, like that of a general melanosis, is extremely slow. Thus I have seen melanotic tumors of the sclerotic which have remained absolutely stationary for 20 years. In the same manner, with the choroidal sarcoma, I have been able to definitely prove that the beginning of the tumor dated back for six or eight years from the time the patient came under observation."

Fuchs relates a case of Stoeber's in which the tumor had existed for 17 years before the operation, and the patient remained healthy for 10 years after it.

If we consider, on the one hand, the experience made by myself and by others, that not infrequently after an apparently radical removal of a very small choroidal sarcoma by enucleation, metastases occur strangely soon after the operation, and that, on the other hand, choroidal sarcomata left to themselves are borne very often for a long time without damage to the inner organs, I must confess that I have often put the question to myself whether we really benefit the patient when we remove by enucleation a small, probably very slow-growing intraocular tumor, which causes little visual disturbance and no pain. And yet, when the diagnosis of tumor is made, hardly any physician will decide to keep a waiting attitude. The fact that postoperative local relapses in comparison with the often very slow growth of the primary tumor, spring up and grow with astonishing rapidity, also gives food for thought.

Let us recapitulate what Ehrlich and his pupils have proven when making experimental tumor studies on mice and rats.

Ehrlich says: "I believe that misplaced tissue germs play a very large rôle in tumor ætiology, but by themselves are by far not sufficient to produce a newformation; in my opinion there must be added a second and most important factor, that is, the reduction of the normal character of atrepsia." Atrepsia means the absence of a certain material which is absolutely necessary for any tumor development. The germs, according to Ehrlich, are very frequent but remain latent on account of this defensive arrangement of the organism. He says further: "That, aside from this atreptic immunity, there is also an active immunity is proven by the following experiment. If rats which had once been successfully inoculated are after the proper time again inoculated with the same tumor (primary mouse carcinoma), the result is at first negative. The lack of success from this second inoculation can be due only to an active immunity, that is to the formation of antibodies, provoked by the absorption of the tumor tissue." And further on: "If we imitate the formation of metastases experimentally, that is by again inoculating animals, which previously had been successfully inoculated with a quickly growing mouse tumor, after eight or ten days with the same or another tumor, the second inoculation with few exceptions will be without success. The easiest explanation of this fact is that the first, very vascular tumor, during its giant growth taking its nourishment, so to speak, with a thousand mouths withdraws from the blood the substances necessary for its growth so completely that for the second tumor inoculated under such unfavorable circumstances, as well as, for embolically disseminated tumor cells, not sufficient of the material for their further growth is left. The slower a tumor grows, the less nourishing substances does it need to assimilate, the less favorable, therefore, are the conditions for the growth of secondarily inoculated or embolically disseminated cells."

On the genesis of carcinoma Ehrlich again states that in mice with a large quickly growing tumor a second inoculation generally does not take or at least only very slowly, and that the percentage of metastases is relatively much higher with slow-growing spontaneous tumors than with quick-growing inoculated tumors.

Apolant says: "A reduction of the virulence of the tumor cells is possible (*a*) through a direct damage to the tumor cells, as for instance by cold; the tumor then grows avascularly and soon becomes necrotic; (*b*) by increasing the resistance of the host when by repeated previous inoculations the animal has been partly immunized against this tumor."

Von Dungern states: (1) The malignity of the so-called malignant tumors must be sought for in the malignant cells themselves. (2) There is no longer any doubt, that experimentally animals can by previous treatment be made secure against a malignant tumor transplantation, and, as Ehrlich has found, this immunity which results from the absorption of tumor cells is not a specific one."

Previous treatment with carcinomatous material guards not only against transplanted carcinoma tissue, but, also, against sarcoma, and *vice-versa.* Ehrlich calls this interesting, again and again found conditions, the pan-immunity. Whether we can immunize against autochthonous tumors, and whether the tissue of the body can render itself resistent against tumor cells, are still unsettled questions. According to von Dungern and others (Bashford, Uhlenhut) the tumor immunity consists of reactions of the organism which damage the tumor cells.

Von Uhlenhut, Haendel and Steffenhagen have observed a so-called operation immunity. Animals radically operated on without relapse proved to be immune; incompletely operated ones in which a relapse occurred were sensitive on later tumor inoculation. The well-known fact that post-operative relapses grow rapidly and that, as proven by Clunet's experiments, after the removal of a tumor metastases are observed much more frequently than without operation, is in a certain antagonism to operation immunity.

Von Dungen, Clowas, Gaylor and Baesluk, Gay and Lewin have succeeded in immunizing other animals with serum taken from immunized ones.

According to Haendel and Schoenburg the fact is demonstrated that the relapse-free operation of sufficiently developed tumors is followed by a strongly pronounced immunity; that, however, a relapse-free operation of young tumors is not followed by immunity when the individual is later inoculated with its own or a foreign tumor. If tumor tissue is left behind in the operation, and if a local recurrence is observed, the immunity does not result.

Apolant says: "Years ago Ehrlich developed the idea that altered nutritive conditions in the organism are the deciding factor for the spontaneous development of a tumor. All tumors show the peculiarity that their cells compared with the corresponding normal cells show an increased proliferation energy." Ehrlich, and, independently from him, E. Albrecht, explains this difference of normal and tumor cells by their different avidity toward nourishing material and believes that between the tumor cells and the correspondinug body cells a disturbance has occurred in the avidity conditions in favor of the former. Two things are possible: either the avidity of the tumor cells is increased or that of the body cells is diminished. Ehrlich supports the latter view because the results of transplantation of the spontaneous tumor are in general unfavorable. This opinion agrees, also, with the long adopted tendency to tumor formation, and with the fact that tumors develop with predilection later in life. Bashford, Murray and Cramer have shown that extirpated spontaneous tumors can usually with success be inoculated into their host, while in normal animals they grow rarely, which was, also, experimentally demonstrated by Apolant. When a spontaneous tumor is inoculated into another animal with a spontaneous tumor, there seems to exist a considerable disposition of the animal with a spontaneous tumor. Apolant relates very interesting observations made by Ehrlich. As previously stated, in a mouse, the host of a quickly growing spontaneous tumor, inoculations do not take or grow slowly. If, however, the inoculated tumor is considerably more virulent than the first one, it does not only take but retards very materially the growth of the first tumor. Ehrlich's explanation is that the more virulent second tumor withdraws the nutritive material necessary for the growth of the first tumor and thus reduces its further growth.

In order to provoke this atrepsia the second tumor must possess a maximal virulency, this is, however, not due alone to a specially high growing force, but also to the faculty of intensely attracting the nutrient material. Ehrlich calls this *exhaustio* or *areptio.*

If we confine ourselves to these few but undoubtedly proven results of animal experiments, it seems to me that, although similar experiments in man have been made in very few instances (von Leyden and Blumenthal), and do not permit of undoubted conclusions, we can, without transferring the results of the animal experiments directly to man, take note of them in judging our clinical experiences in man. This, as far as I know has thus far not been done at all. The facts proven by animal experiments and the deductions made from them can at least help us to understand the clinical experience, which thus far was impossible, and perhaps, to explain them in an acceptable way on a scientific basis. E. F. Bashford, in a lecture on the cancer problem, says that the value of experimentally produced growth resistance lies in its giving us an insight into the nature of tumors, into the biology of tumor cells and their relation to the organism, without at present being of especial value for our therapeutic endeavors. "All processes of immunity are useless against spontaneous tumors and in the host immunizing procedures have no effect." He finishes the paper by saying: "We must strive to attack the tumor cells themselves, as has been tried by von Wassermann, Neuberg and Caspari."

Let us return from these studies to my case above detailed. It does not seem unpermissible to compare the highly peculiar and thus far complete freedom from any relapse of our patient, in spite of a decidedly incomplete removal of the very large tumor, with the fact which Ehrlich recognized from his experiment that with rapidly growing necrosing inoculation tumors metastases are comparatively rare, and that the absorption of tumor masses causes the formation of antibodies and thus an active acquired immunity.

I am inclined in my own and the other cases above referred to, to assume an active immunity from the absorption of necrosed tumor-cells, which has thus far saved the organism from the appearance of local relapses as well as from metastases. Of course, I cannot prove the correctness of this assumption, yet it seems to me to be permissible; in every case, however, it may give an explanation based on experiments of the otherwise incomprehensible course of these cases. That such cases like mine are observed much more frequently, I believe at present on purely theoretical grounds to be the case on account of the usually relatively early operative removal of the melanotic sarcoma of the choroid, at a time when neither by the absorption of necrosed tumor cells an active immunity nor an atreptic immunity in the sense of Ehrlich has been developed on account of the insufficient size and the slow growth of the tumor.

On the other hand, the observation made by myself and many others, that not infrequently after the removal of small and smallest, apparently slow growing sarcomata of the choroid metastases develop rapidly in inner organs, may find its analogon in the fact, experimentally proven, that with slow growing spontaneous mouse tumors in consequence of an insufficient atreptic immunity, the percentage of metastases is strangely high. Clunet's opinion based on animal experiments, that after the operation of a tumor metastases are much more frequent than without operation, if correct, would support the opinion of Championnière, above mentioned, that melanosarcoma of the uveal tract is a touch me not. I, for my part, am inclined to agree with Championnière as long as the tumor is still very small.

In the May number of this Journal, von Hoor, under "The malignity of the pigmented tumors of the eye," reports a case which seems to speak for this view. Von Hoor's conclusion deducted from this case, that even the smallest nævus pigmentosus should be removed as soon as seen, I cannot accept. Based on my experience I should rather believe that a waiting attitude is the best in these cases. I am convinced that the 15 year old patient of von Hoor, who before the operation looked blooming, would not have died in six months if the operation had not been made.

At present, on theoretical grounds, we should proceed with operative interference in melanoses of the eye only after we are convinced of a well established autoimmunity or a passive immunity brought about by us in the organism which is suffering from a spontaneous tumor.

I may, here, be permitted to say something of the histological side of the study of melanoses of the eye.

Through the kindness of Fuchs, Wintersteiner, Schultz-Zehden, Purtscher, Silex and Wolfrum, I have been able to study their specimens of accidentally found initial sarcomata of the uveal tract. From these specimens it is certain: (*a*) that sarcoma of the choroid begins in the layer of the larger and medium sized blood vessels of the choroid; (*b*) that it spreads laterally between the lamellæ of the suprachoroid, i.e., the most external layers, and (*c*) that the chorio-capillary layer is not always free from sarcoma cells, as is shown especially in Wintersteiner's specimen. The question of the origin of the sarcoma cells which are plainly differentiated from the other cells in these smaller tumors (of about 1½ mm. diameter and about 0.3 mm. height), whether from the physiological chromatophores of the choroid, whether from the adventitia of the bloodvessels, whether from the endothelia of the elastic lamellæ, can in my opinion even with the strongest immersion lenses not be decided with certainty by microscopical examination. Even in the earliest stages of tumor formation there is already a finished, characteristic tumor tissue which, as Ribbert rightly says, at all times of its existence is connected with the surrounding tissue locally, never genetically, and, therefore, forms an independent entity. I think from the study of the specimens of initial choroidal sarcomata I must agree with his conclusions that (1) from the local connection with the surrounding tissue we can never conclude that the tumor sprang from it; (2) from the behavior of the surrounding tissue we can conclude nothing as to the genesis of the existing tumor. This is especially clear from the beautiful specimens of Schultz-Zehden, which are one-celled and beautifully stained and permit of recognizing the tumor cells differentiated from the surrounding so plainly and sharply that they can easily be counted.

The idea first pronounced by Cohnheim, later on developed by Ribbert, that most tumors spring from misplaced tissue germs separate from the rest of the organism, must appear at least very probable to every one who has occasion to see these earliest stages of initial true tumors. If, however, with the microscope in these no transition forms from physiological to pathological cells can be found with certainty, how can we expect to find them in larger tumors which, as is universally agreed upon, grow out of themselves only; yet, large tumors are usually submitted to our microscopical examination. The explanation of the microscopic pictures thus found depends, I might say, on the taste of the examiner, that is, it is always subjective, never convincing, and objective.

After I had written this, a paper by B. Fischer on fundamental problems concerning tumors came into my hands. Regarding the value of microscopical studies for the histogenesis of tumors and other pathological processes, he says:

"By the anatomical (microscopical) method facts as to the genesis of tumors cannot be be obtained." Further: "That the microscopical study, aside from its extraordinary advantage of viewing the undisturbed structure of the object, labors under the great disadvantage that it gives only rigid momentary pictures of all these structures. The anatomical method cannot observe processes." "He calls the employment of microscopical studies as to histogenesis an overvaluation and faulty application which cannot be extirpated completely enough." Again: "The tumor cell is a cell by itself; it is biologically and qualitatively different from all normal cells at any stage of their development." * * *

* * * Taking into account the present opinion of tumor genesis of our most prominent pathologists like Albrecht, Beneke, Borst, Cohnheim, Fischer, Herxheimer, Lubarsch, Ribbert, Schwalbe, Ziegler, etc., who aside from more or less difference in detail agree in the one and most important point, that most true tumors spring from misplaced embryonic germs or cell groups which functionally have remained below the standard, and as Ribbert has taught, grow only out of themselves, we must consider the again and again repeated attempts in ophthalmologic literature to explain the choroidal sarcoma by a transformation of one or the other normal cells as without proof. It is astonishing that, as far as I can see, the ophthalmological tumor literature has hardly taken account any more of the experimental tumor study, than of the modern views concerning the tumor genesis. The aim of this paper is to recall these views to the memory of ophthalmologists. * * *

* * * In accord with Albrecht's opinion I believe it possible that a part of the sarcomata developing in the lower half of the choroid are due to disturbances in the closure of the choroidal cleft through the interposition and persistency of abnormal filling tissue. Tumors of the optic nerve might have the same genesis.

The cause for the growing into true tumors of the preformed embryonic tissue germs which may for a shorter or longer period, in most cases forever remain latent, is in general unknown. However, by Albrecht's views they are brought nearer an understanding, at least in certain cases. It can hardly be doubted that traumata and chronic inflammatory processes to which the eye is so often subjected without being followed by tumor formation, must in a whole series of cases be looked upon as the genetic causes of tumors. As difficult as it is to conceive how a contusion of the whole eyeball can induce a hitherto perfectly normal cell or cell group to change into a tumor cell and to proliferate to tumor formation, so probable does it appear to me that the same trauma is occasionally the cause of tumor formation, if we assume in the eye a preformed embryonic tumor germ, hitherto latent, which is set to proliferating by the trauma to the whole eyeball and the resulting irritation. In the same manner it might be possible to explain the not infrequent tumor formation in eyes with iridocyclo-choroiditis. * * *

* * * In view of the total inadequacy of all attempts to explain the appearance of metastases 5, 10, 15, even 17 years after the radical removal of the primary tumor, it seems to me that from the Cohnheim-Ribbert-Albrecht standpoint we are justified in questioning again and again whether such late metastases are really such in the meaning of Virchow, or whether we may not have to deal with the growth of preëxisting tumor germs totally independent of the so-called primary tumor, the development into true tumors of which is only temporally very different from the first tumor.

The cause of this sudden and usually rapid growth of these latent tumor germs is at present as little known as that of the growth of the primary tumor. If we adopt Ehrlich's view, here again the changed nutritive conditions in the organism which produced the hypothetical growing material must play the chief rôle.

OPENING OF A NEW EYE HOSPITAL.

The Herman Knapp Memorial Eye Hospital has opened its doors in its new location, at the S. W. corner of 57th Street and Tenth Avenue, New York.

The hospital was founded in 1869 by the late Dr. Herman Knapp, and under the name of the "New York Ophthalmic and Aural Institute" it has been in uninterrupted activity at 44 and 46 East 12th Street. During these forty-four years over 420,000 patients have been treated. The new building is a specially constructed seven-story fire-proof hospital building, with complete modern equipment for the treatment and study of diseases of the eye.

The Board of Trustees has deemed the occasion of its removal to a new building in a new location the proper time to change the name of the Institute in honor of its distinguished founder.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
ST. LOUIS, MO.

ARTIFICIAL ILLUMINATION A FACTOR IN OCULAR DISCOMFORT.

Nelson M. Black and F. A. Vaughn (*Jour. A. M. A.*, September 27, 1913, Part 2) discuss the cause of ocular discomfort from artificial illumination and say:

In conclusion it might be said that the eye at present, through the process of evolution, is adapted to solar light and can accommodate itself to marked variations in intensity of light of this character with less discomfort than with artificial illumination, because of the quality of the retinal stimulation. There is, however, no reason why ocular discomfort should be any more in evidence with the use of artificial illumination than with solar light, when due consideration is given to the various factors and important conditions bearing on its proper and intelligent application; for, as has also been pointed out, unintelligent and unscientific application of solar light to our every-day needs may and does produce even more harmful results than those often produced by artificial illumination. Beneficial results can certainly be obtained through thorough investigations of the effect of different wave lengths, and amounts of energy on the eye; the adjustment of the color of artificial illumination by selection and design of source; the modification of the effects by selection of color and characteristics of the surroundings; the change in color of reflected light by the color absorption characteristics of paper, ceiling and other surfaces, and the practical application of the ultrared and ultraviolet absorption characteristics of glass and other media. The ocular comfort of this and future generations depends on the solution by illuminating engineers of the problems of the proper application of artificial and natural illumination and it is gratifying to note the concordance of ideas and methods of application, and the unanimity of purpose, exemplified by the work of active members of this profession, in co-operation with physiologists, psychologists and ophthalmologists who are interesting themselves in this subject.

INTERSTITIAL KERATITIS (CONGENITAL SYPHILITIC) TREATED BY SALVARSAN.

G. F. C. Wallis (*The Ophthalmoscope,* June, 1913) reports the results of ten cases of congenital interstitial keratitis treated with salvarsan. A positive Wassermann reaction was found in nine of the cases while in the tenth a positive Noguchi "Luetin" test was obtained. The injections were given intravenously and repeated as far as possible every ten days to two weeks until the required number had been given. In most of the cases, following the first injections, the same night or the next morning more often, there was some local reaction, with increased photophobia, lacrimation and in some cases pain. Generally after the third or fourth injection these symptoms did not occur. Little or no improvement follows the first one or two injections. In fact the condition may appear to be aggravated. However, after three or four doses the corneæ begin to clear, the pupils dilate more readily and the ciliary injection and photophobia to subside. In seven out of the ten cases the vision has been restored, varying between 6/24 up to 6/9 in from two to three months. In one case in which one eye was affected, after thorough treatment with salvarsan and after the eye had almost completely recovered, the second eye became involved, showing that salvarsan does not prevent the involvement of the unaffected eye in monocular cases. While in this respect the treatment is disappointing the author believes that salvarsan is of great benefit in a considerable number of cases, bringing about recovery in much less time than suffices with the old treatment by mercury and iodids. He uses the salvarsan in addition to the old treatment, local and constitutional, and not to supplant it.

HYDROPHTHALMOS.

WITH A HISTOLOGICAL REPORT OF TWO CASES, ONE OF WHICH PRESENTED A CONGENITAL COLOBOMA.

William Zentmayer (*Jour. A. M. A.,* September 27, 1913, Part 2), in the spring of 1912, saw three cases of this uncommon condition, all of which were in negro children. Having recollection of seeing but six cases of this disease in his experience, four of which were in negroes, two of these presenting marked evidences of hereditary syphilis, he decided to collate the opinions of others as to the relationship of race and syphilis to the ætiology of the disease; also their experience in the treatment of the affection. The replies to questions on these points sent to a large number of ophthalmic surgeons apparently show that the negro race is not especially susceptible to the affection. If hereditary syphilis has any ætiologic bearing on the production of the condition, the replies fail to show it. The fact that the negro race is not more susceptible than other races argues against this disease as a special factor.

An analysis of the replies showed that iridectomy gave fair results to 42 per cent., and poor results to 58 per cent. of the operators employing it. Sclerotomy gave fair results to 28 per cent. and poor results to 72 per cent. of the operators using it. Paracentesis of the anterior chamber with iridectomy gave unsatisfactory results to 100 per cent. of the operators using it. Sclerectomy gave satisfactory results to 40 per cent., encouraging to 20 per cent., and unsatisfactory to 40 per cent. of the operators using it. Miotic treatment was on the whole found to be unsatisfactory. The dangers and objections of iridectomy and sclerotomy, the two operations which have been longest employed, are discussed by the author and brief histories of two of his cases with the findings of anatomic studies and microscopic examinations are given. These, he says in conclusion, lend additional support to the view that the essential factor in the production of hydrophthalmos is an absence or incomplete development of the canal of Schlemm and that a probable contributing factor is the presence in the angle of the anterior chamber of prenatal connective tissue.

TEMPERATURE OF THE CONJUNCTIVA.

Lucien Howe (*Jour. A. M. A.*, September 27, 1913, Part 2) describes his method of taking the temperature of the conjunctiva and comparing it with that of the mouth, which is done with an arrangement he calls thermo-couples used in connection with a galvanometer. With this he can detect a difference of temperature of 0.03° C. or even 0.015° C. He raises the question, What do we learn from the use of these thermo-couples? and answers it as follows:

1. We know now for the first time that the temperature of the culdesac of the conjunctiva near the outer or inner canthus

is usually from about 0.3 to 0.04 degree C. lower than that of the mouth. This finding was at first rather surprising, and was naturally attributed to some fault in the instrument or in manipulation. Repeated trials, however, on different individuals seem to establish the fact beyond question. The reason of this is probably that the couple placed in the mouth rests against the tongue, and is protected by that on one side, and the thick layer of facial muscles on the other. On the other hand, the globe of the eye is protected only by the lids, much thinner of course than the cheek, and therefore not only colder, but more sensitive to variations of external temperature.

2. The temperature of the conjunctiva immediately over the cornea in six individuals was found to be on the average 0.1 degree C. lower than at the outer or inner canthus.

It will be observed that 36.9 C., or about 98.6 F., can be considered as the normal temperature. In several of the measurements the patients held in the mouth not only Couple B but also a Centigrade thermometer graduated in fifths of a degree, and accurately corrected by the Bureau of Standards. This gave the absolute temperature of the mouth, from which by comparison it was possible to obtain the absolute temperature of the conjunctiva. In these measurements also care was taken that no cold or warm fluids or food had been taken into the mouth for some time previously, as such substances affect the temperature for minutes or even for a few hours.

3. It is possible by this method to measure for the first time to what extent cold or hot applications to the outer portions of the lids really change the temperature of the conjunctiva. It was found, for example, in one case that when pieces of cotton moistened with ice-water were applied to the lids in rapid succession four or five minutes, the temperature of the conjunctiva could easily be reduced 1 or about 1.5 degree Centigrade.

On the other hand, the difficulty in reducing the temperature below that increased rapidly with each fraction of a degree.

This point is of importance in connection with the treatment of bacterial infections. It is well known that many of the forms which invade the conjunctiva have their vitality lessened in proportion to the decrease in temperature. Practically, however, it is difficult or impossible to produce such a change in the temperature as prevents the growth of these bacteria in the test-tube. This is a phase of the subject which seems worthy of much more careful study concerning each separate germ.

4. It is probable that the thermo-couples here described will prove of some value in at least two other directions. These are:

A. Indicating changes of temperature which accompany certain inflammatory conditions of the cornea, uvea or other portions of the globe itself.

B. Inasmuch as efforts of accommodation and convergence are often followed by slight injection of the conjunctiva, it is quite possible that with these two couples we may be able later to obtain a better idea of the metabolic changes which take place in that complicated process which we call eye-strain.

In a word, the field which thus opens before us for the first time seems to be one ripe and ready for a harvest of interesting facts by the ophthalmologists of the future.

TOPICAL DIAGNOSTIC VALUE OF THE HEMIOPIC PUPILLARY REACTION AND THE WILBRAND HEMIANOPTIC PRISM PHENOMENON.

WITH A NEW METHOD OF PERFORMING THE LATTER.

Clifford B. Walker (*Jour. A. M. A.*, September 27, 1913, Part 2) describes his methods of making these tests, summarizes the subject and offers the following conclusions:

I. HEMIOPIC CAPILLARY REACTION.

1. Nothing has been noted in these cases in disagreement with the theories of Heddaeus and Hess that the peripheral retina lacks pupillomotor sensitiveness.

2. The possibility of a hemiopic pupillary reaction within the pupillomotoric area is suggested.

3. In absolute central scotoma cases the absence of direct pupillary reaction without other cause than the scotoma speaks for the absolute central involvement of an area at least as large as the pupillomotor area, while the presence of direct pupillary reaction when the central scotoma is greater than the pupillomotor area as tested by large disks requires further tests for light-perception as described.

4. Observations may be complicated by "concentric movement" or other psychic reactions which may sometimes be eliminated by repetition.

5. Clinically the hemiopic pupillary reaction, in those chiasmal lesions of dyspituitary origin, or rather rapid onset and rapid re-

covery after operation, has failed, possibly due to a certain retention of pupillomotoric function, centrally, after vision for disks has been lost by the hemiopic retina.

II. THE WILBRAND HEMIANOPTIC PRISM PHENOMENON.

1. The peculiar distribution of field defects in anterior and posterior lesions often adds to and encourages psychologic factors which greatly complicate the Wilbrand test.
2. The presence of peseudorefixation, as demonstrated by the new method described, throws serious doubts on the presence of a definite reflex arc in the Wilbrand prism-phenomenon.
3. Clinically, the Wilbrand test has offered no valuable diagnostic data in these cases.

MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY.

(233 Charles Street, Boston, Mass.)

Examinations for the appointment of House Officers on January 1, 1914, of one Aural and of one Ophthalmic House Officer will be held at this hospital on Thursday, December 11, 1913, at 10 a.m.

The service in the Aural Department is of eighteen months duration, with residence in the hospital.

The service in the Ophthalmic Department is of eighteen months duration, with residence in the hospital.

Applicants are examined in Anatomy, Physiology, Bacteriology, Pathology, Clinical Medicine and Therapeutics, and Surgery.

Application must be made before December 6, 1913. Application blanks can be obtained from the Superintendent at the hispital or will be sent by mail.

The number of patients treated in the wards last year was 3,652; 1,756 eye, 1,896 ear. The number of new out-patients was 30,012. The total out-patient attendance was 58,062. By these figures some idea can be obtained of the clinical opportunities offered.

Farrar Cobb, M.D., Superintendent,
233 Charles Street, Boston, Mass.

BOOK REVIEWS.

THE AMERICAN ENCYCLOPEDIA OF OPHTHALMOLOGY. Edited by Casey A. Wood, M.D., C.M., D.C.L., assisted by a large staff of collaborators. Fully illustrated. Volume II, B to Cataract, incipient. Chicago: Cleveland Press, 1913.

Like the first volume of this Encyclopedia, the second one is surprising by the vast amount of material collected under, one might say, one letter only, because words under B fill the largest part of it. The most important subjects have been given a space commensurate with their importance. Thus the excellent article on Bacteriology of the Eye by McKee with its illustrations comprises 94 pages, a book in itself. Blepharoplasty by Beard is another such article which is given sufficient space to make it as complete as possible. It is out of the question to refer even to all the most important articles; in fact it is hard to say what is the most important. One thing seems to be certain, that whatever subject is looked up will be found not only to have its place in this Encyclopedia, but to be handled in the best possible manner. Not the least interesting part are the biographical sketches by Shastid.

The editor and publisher are alike to be congratulated on the appearance of this volume, a number of misprints notwithstanding.

PRECIS D'OPHTALMOLOGIE. (Textbook on Ophthalmology.) By Dr. V. Morax, Ophthalmologist of the Lariboisière Hospital. Second edition, with 427 figures and 4 colored plates. Paris: Masson & Cie., 1913.

This is one of the best textbooks on ophthalmology written in the French language. The present second edition by some additions is fully brought up to date. Its numerous illustrations are very practical and instructive.

GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE. By R. Greef in collaboration with Stock & Wintersteiner. Translated from the third German Edition by Hugh Walker. London: The Ophthalmoscope Press.

Mr. Walker deserves great praise for his excellent translation into English of this very practical and useful book of Greef's. As it is, also, the only book on this subject in English it cannot fail to gain a wide field of usefulness. Every student and laboratory worker should possess it, if only for ready reference when in doubt about some point in his work. ALT.

THE AMERICAN JOURNAL
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TRANSLATIONS.

RESULTS IN TREATING DETACHMENT OF THE RETINA.*

(TWENTY YEARS OF PERSONAL EXPERIENCE.)

By Dr. A. Darier.

Translated by Adolf Alt, M.D.

Dr. D. T. Vail,† of Cincinnati, in studying the therapeutic results in detachment of the retina, sent on May 4th, 1912, a letter to 460 American oculists asking:

(1) How many non-traumatic cases of detachment of the retina have you permanently cured?

(2) What mode of treatment do you apply?

The medical treatment applied was in most cases: locally, atropin, dionin, subconjunctival injections of a 1 to 20 salt solution, of a 10 per cent. dionin solution, of sodium saccharinate, of sugar, etc.; the general treatment was, injections of pilocarpin, iodide of potassium, bichloride of mercury, calomel, iron, tonics, salicylate of soda, purgatives, thyroid extract, etc., to which were added dark room, rest in bed, steam baths, diet, dry diet, electric baths, massage, compression bandage, leeches. The surgical treatment consisted of scleral puncture, posterior sclerotomy, retinal puncture, galvanocautery, electrolysis, scleral incision in the shape of a T, trephining, drainage, Deutschmann's operation.

Results: Of 281 writers 250 have never seen a case of cure; some noted a temporary improvement.

Here, then, are 250 oculists of name practicing in large cities, with an average experience of 20 years, who have not cured a

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*LaClinique Ophtalmologique, November 13.
†Annals of Ophthalmology, January 13.

single case of detachment of the retina. On the other hand there are 31 oculists who have obtained some cures; 25 have had only 1 permanent cure, 4 have had 2, and 2 have had 4 cures. This makes 41 cures and hardly gives 1 cure in 1,000 cases, as Vail says.

Vail's conclusions are: Having used the knife for puncturing, cautery for burning, the scissors for opening some window, the torture of the dark room, iodide of potassium, salicylates, sweats, compressive bandage, etc., is this not a barbaric treatment for obtaining 1 cure in a 1,000 cases?

These deplorable statistics, we comprehend, must strike the practitioner and drive him to complete inactivity. We must react against this pessimism. I, surely, am satisfied that I have cured more than 1 case of detachment out of a 1,000. Here is what my clinical books, especially the visual fields, reveal from October, 1893, to the 1st of October, 1913. In 20 years I have observed 108 cases of detachment of the retina; only three of these were traumatic, and all three were cured (by subconjunctival injection of salt). There remain 195 cases of myopic detachment, some of which had previously lost one eye by the same affection. 45 of these cases came only for one consultation and underwent no treatment. What became of them I do not know.

Sixty cases were treated by subconjunctival injections, scleral puncture, electrolysis, etc., 27 were not improved in spite of all therapeutic attempts.

Twenty cases showed a more or less marked improvement and kept a certain degree of vision for years with a more or less floating retina.

Thirteen cases only are entered as cured, that is their retina was completely reapplied; this does not mean that their vision was normal, because after a detachment frequently retinal and choroidal changes, often macular, remain behind which do not permit the return of normal vision, even if it was normal before the occurrence of the detachment. In fact, the detachments which were accompanied, or rather preceded by foci, and especially striæ of choroiditis, offer a better chance for a cure. In such cases the best results are obtained by subconjunctival injections of a solution of salt and cyanide of mercury, the strength of which is gradually increased while making an injection every 5 to 7 days.

(1) I have been considerably interested in following up such a case of completely cured detachment for 22 years (the other

eye had been lost previously by detachment and had a secondary cataract).

The upper half of the field had been obliterated completely; a few subconjunctival injections of cyanide of mercury brought about a complete cure.

Since this cure 22 years ago the patient comes every two or three months to ask for an injection, as soon as he sees some mouches volantes. He reads his without glasses and has 1/3 vision with —7D.

(2) Another patient whom I have operated on 18 years ago by electrolysis and subconjunctival injections has had her retina completely reapplied, but in the formerly detached part a degeneration has taken place which gives it the aspect of a pigmentary retinitis. Her vision is good in the larger part of her field, but the region of the former detachment gives a negative scotoma with the campimeter. To-day her vision is still 1/3 with —9D.

(3) Another has been cured for three years, and he might count for two, since while he was treated the other eye was affected by a visual disturbance with violet phosphenes and a small peripheral scotoma which disappeared after two subconjunctival salt injections. R. E. V.=2/3 with —8D.; L. E.=2/3 with —8D.

(4) A fourth patient having lost the right eye by detachment was cured of a very large detachment in the left eye by electrolytic puncture and subconjunctival injections. He remained perfectly cured for 2 years with V. 1/2 with —10D. Following an injury to this eye, he had a second and almost total detachment of the retina which resisted every treatment.

(5) The fifth cured patient has not been seen for 5 years. He was perfectly cured with a normal field.

The three last cases are rather recent, one being only 2 years old.

(6) The one eye had been lost by detachment, the other had only a slight fluttering of the peripheral retina, which disappeared after five subconjunctival injections of salt and cyanide of mercury. V.=1/4 with —22D. Field normal.

(7) Miss D., cured for 18 months; still for safety sake receives an injection of salt and cyanide of mercury every 2 months. V.=1/3 with —7D. Field normal.

(8) Finally, the last case is still under observation. His detachment has altogether disappeared after the first subconjunc-

tival injection of gelatinized salt solution. He has received 6 more and his cure has now lasted 6 months. R. E. V.=1/2 with —9D. Field normal.

(9 and 10) Two more patients might be regarded as cured. The detachment had disappeared, but in the first one enormous myopic macular lesions permitted only of V.=1/5 with —10D.

The other cured after electrolysis and subconjunctival injections regained the field for white, but his vision remained very defective. He has not been seen for 10 years.

I shall, furthermore, not speak of a case of detachment with a positive Wassermann who for two weeks has been cured by two injections of enesol.

To conclude, in these statistics of a modest practitioner of 60 detachments of the retina which were treated, 20 were improved and have conserved a more or less useful vision; 6 were perfectly cured.

It must not be forgotten that we have set aside 3 cases of traumatic detachment, because they were not myopic, which are the only really difficult ones to cure. Neither do we count 4 cases entered as cured, because we have never seen them again.

Putting aside the 3 traumatic cases, we have still 6 cures and 20 improvements in 60 cases which were treated out of 108 cases seen and whose fields were taken, 45 of whom, however, refused to submit to any treatment.

This is far from Vail's statistics, which give only one cure to 1,000 patients. Even counting only the 6 cases cured and observed to this day, we have 10 per cent. of cures, not counting either the partial improvements.

I know, of course, that it may be claimed that a cure may occur spontaneously. Just as cataracts have been seen to become absorbed, so spontaneous cures of detachment are reported.

Quite recently at the meeting of the Royal Society of Medicine, London, Harmon related a case of spontaneous and sudden cure of a retinal detachment of 3 months existence, with a myopia of 10D.

G. Goudie reports the case of a child cured equally spontaneously after 3 months, followed by a relapse and a permanent cure after two months with good vision. Batten saw a double detachment in a myope of 20D. who after 2 years regained sufficient sight to get about. Parsons, too, reported a case of spontaneous and complete cure, but with a relapse of 18 months later. McNab saw a double case of detachment of the retina spontaneously cured.

Maiz Karl in 1912, in a thesis on 65,578 cases treated at the Tuebingen Ophthalmic Clinic from 1900 to 1911, gave retinal detachment in 0.5 per cent. of the cases, 90.2 per cent. remained monolateral, 9.8 per cent. became bilateral. Most of these cases were not treated and yet a spontaneous cure occurred in 4.6 per cent. Of those treated by subconjunctival injections, rest, compressive bandage, sweats, iodide, etc., 4.4 per cent. were cured whether they happened in myopic or hypermetropic eyes.

This is certainly a disconcerting statement. Here we have 4.6 per cent. of cures without treatment, and Vail tells us that the treatments used in America gave only 1 cure in 1,000 cases. Logically we should have to conclude that treatments have caused the loss of 45 eyes, since 46 have healed spontaneously.

I believe for my part it is the wisest, and conforms most with our profession as physicians, to treat the detachments; however, never to lose sight of the rule: *"primo non nocere."*

Therapeutic indications in detachment of the retina.—The medical treatments should come first, since they entail the smallest responsibility. We should first place the patient to bed for about a month; compressive bandage and massage have given but poor results; leeches to the temple, dionin, eserin, pilocarpin, iodide of potassium, collyria, diaphoretics and drastica, etc., have a more than problematic action.

Surgical methods do not in all cases give very satisfactory results. They are: discission of the detached retina (von Graefe), simple scleral puncture (Ware, Sichel, Wolfe, Parinaud), aspiration or drainage of the subretinal fluid (Galezowski, De Wecker), iridectomy or sclerectomy (Dransart, Boucheron, Galezowski, Bettremieux), intraocular injections of iodine (Schoeler, Abadie), of salt, air, etc. (Birch-Hirschfeld, Rohmer), ignipuncture (De Wecker, Dor, Chevallereau), electrolysis (Abadie, Terson), discission of the fibres of the vitreous body, and transfixion of the detailed retina with or without intraocular injections of rabbit's vitreous body (Deutschmann). In spite of the number of variety of methods, the lasting cures of retinal detachment are very rare and this explains the reticence of a great many practitioners.

Uhthoff of 422 cases of detachment which came to him treated only 85 and of these 18 were cured; 10 after medical and 8 after surgical treatment. Of 351 cured cases reported in literature, he notes 31 per cent. spontaneous cures, 45 per cent. by medical and only 24 per cent by surgical treatment. These statistics are little encouraging for the surgeon; but it must not be forgotten that the cases submitted to surgical interference are those which have previously resisted medical treatment.

According to the opinion of all practitioners, this treatment brings no danger to the patient, nor any fear of complication for the physician. We can advise the following in perfect security:

A myope of more than 6 dioptries (it will be the same for a traumatic detachment, only in such cases the prognosis is much more favorable) presents himself with the detachment of one-third or one-quarter of the retina, which has quite recently taken place. (If there is a detachment of more than half of the retina, the prognosis will be very guarded, especially if the detachment is old.)

The first duty will be to order the patient to lie on the back as uninterruptedly as possible with a slightly compressive bandage; but the more urgent thing to do is to make at once a subconjunctival injection of salt, which is well borne and almost painless if the following precautions are taken:

(1) The salt solution must be aseptic.

(2) A 1 per cent. solution of acoin or better yet, the gelatinized acoin serum recommended by Bellencontre in 1910 and which I have used ever since because it is somewhat difficult to prepare the acoin solutions and because the addition of 30 per cent of gelatine has seemed to me to have a favorable action as well on the detachment as on the hæmorrhages.*

The first injection may be made with the simple gelatinized acoin serum, and if it does not cause too vivid a reaction, the next morning one or two-tenths of the syringe of a 20 per cent. salt solution may be added to the acoin serum. This would give 2 per cent. or 4 per cent. of salt solution in the serum. As soon as the reaction caused by this second injection has about passed (2 or 3 days), a third one is made with an increase of the salt solution and so on finally up to 6 per cent. Personally, I very rarely inject solutions with more than 10 per cent. of salt. Because these injections are very painful and cause a violent reaction, we can add 0.005 to 0.01 of dionin, and afterwards have two leeches or a Heurteloup applied to the temple. The stronger the solution the more the chemosis and œdema are marked, and the greater must be the intervals between the injections (from 5 to 8 days).

I may here say a few words as to the technique of the subconjunctival injections. I have given them an uncounted number of times in the last 22 years and yet I am always struck by the surprise of the colleagues who see me make them. They say they have never known the perfect ease and simplicity of this intervention which they have practiced with apprehension only.

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*This serum can be had at Pelloile's pharmacy, 2 Faubourg St. Denis, Paris, in sterilized ampoules, containing Acoin, 0.0015; Fish glue, 0.03; Isotonic serum, 1 cc.

The technique is of the simplest: No other instrument is needed but a Pravatz syringe armed with a curved platinum iridium needle, 28 to 30 mllm. long and well pointed. The needle is flamed before each injection. Of course the syringe and solution must be sterile. The patient need not lie down, nor need he be frightened by a speculum or forceps. The most important part is to cocainize the eye well by 3 instillations 10 minutes apart. The injection must not be made sooner than 25 minutes after the first instillation.

The patient seated in a chair is to direct his eyes forcibly downward and the operation pushing the upper lid backwards with the left thumb, uncovers the whole upper and outer conjunctival surface of the globe. The needle is then guided superficially between the lid and the globe with its convexity forwards so that it hugs the convexity of the eyeball; the point is slightly held away from the eyeball until the cul-de-sac is reached, then by a slightly rotating motion the needle passes through the conjunctiva and then is pushed more and more deeply so that the injected fluid gets behind the æquator of the eye.

Thus one avoids that the injected fluid detaches the vascular pericorneal circle and produces affections of the cornea and causes those conjunctival escharas which have been pronounced as due to badly made injections. When it is necessary to inject more considerable quantities of fluid (massive injections of 2 to 3 cmm., Jones) we must be very careful to penetrate with the needle as far as possible into the retrobulbar tissue. I should not recommend to try and penetrate into Tenon's capsule; it is more useful to inject farther back near the apex of the orbit.

The subconjunctival injections must not be repeated too often; we must always permit nature to perform her work of reconstruction. As long as there remains any chemosis or swelling of the eyelid, unless there are urgent indications, it is best to wait.

After each injection a slightly compressive bandage is applied, having first made several instillations of atropin because the pupil must be carefully watched. The slightest iritic sign shows that the reaction is too strong and may lead to synechiæ, which must be avoided. In such a case the interval between injections must be increased, leeches must be applied, atropin instilled, etc. Dionin instilled every 8 days will have a beneficial effect.

Usually, after the first and second injection a well pronounced improvement, sometimes even an apparently complete cure, is observed. But we must not stop the treatment, because the re-application of the retina must become consolidated and the patient should be watched continually, so that he does not commit any imprudent action and does not try to get out of bed too soon. The treatment with the patient on his back should be continued for at least one month, with an increasing interval between injections.

If, on the contrary, after the first injections little or no improvement takes place, the prognosis is more serious, yet one must not despair. Then the dose of the salt should be increased and its action be augmented by the application of leeches or cupping, by sweats provoked by hot drinks (jaborandi), by injections of pilcarpin, or by a mixture containing salicylate, being careful not to produce nausea and vomiting.

We must also consider the occasional cause of detachment. The myopia is only the predisposing cause. If we find a positive Wassermann a general antisyphilitic treatment is commanded and the subconjunctival injections must be made with a mercurial salt (cyanide). The following formula will be useful:

Cocain, hydrochl.	0.50
Cyanide of mercury	0.05
Sodium chloride	2.00
Sterile water	100.00

Of this a cubic centimetre is injected under the conjunctiva every 4 or 5 days.

When, however, a positive tuberculin reaction is obtained the treatment must be directed accordingly. Hypodermic injections of tuberculin have given Dor and von Hippel very encouraging results. Subconjunctival injections of tuberculin cannot be recommended. Thus far they have given no great satisfaction to those who have used them. It is better in the local treatment to be content with salt injections.

In detachments which are severe on account of their age or extent we may first try subconjunctival injections, but they are usually without effect. We may then try simple puncture or Deutschmann's transfixion without or with injection of vitreous body, salt solution, or sterilized air; but it will be well not to use any of these surgical procedures without having informed the patient of their gravity and great risks.

OBITUARY.

JOHN GREEN, M.D.

1835-1913.

On December 7th, Dr. John Green died at his residence in St. Louis from pneumonia. He was in his 79th year, having been born at Worcester, Mass., on April 2d, 1835.

A pioneer in ophthalmology, he has lived and practiced in this city since 1866, and at the time of his death was its oldest ophthalmologist.

His long life was one of great usefulness and full of activities. For many years he enjoyed a very extensive practice. In spite of oncoming age and infirmity he worked in his profession with unaltered devotion up to the day on which he was stricken.

He was a scholar in the full sense of the word, having stored up a vast knowledge, not only in his chosen specialty and medicine at large, but even in fields lying apparently totally outside of his professional sphere.

Having studied with Donders in his early career, his, as it seems, inborn special interest in the problems of refraction and accommodation, had received a further impetus, so that he devoted a large part of his work to the study of these subjects. In consequence of this and the scrupulous exactness on which all his scientific utterances were based, he was recognized as one of the foremost authorities in these questions. His test cards were and are used all over the world, although their originator has sometimes been forgotten by men who appropriated them. Numerous papers by him on these subjects are to be found in the Transactions of the American Ophthalmological Society and elsewhere. Even his last paper published in this Journal, "On coquille protective spectacles," shows that such mathematical problems engaged his mind up to the end.

In his literary work, which was done with great care, he was always clear and convincing.

He was a skilled operator, and in the earlier years of his practice here he evolved the operation for entropium, which goes by his name and which he made known to the profession at the International Congress of Ophthalmology in 1876. When he later found out that the main points of his method were considerably older than he had known and could be found described as far back as in Celsus and Paulus Aegineta, he not only did not hesitate to inform the profession on this subject, but went even so far as to have the pages photographed on which these earlier descriptions were to be found (Vols. I and III, this Journal).

In this as in the other of his numerous publications, some of which were even written in the German language, he showed himself a man of keen observation, sharp critcism and an almost exaggerated accuracy as to detail.

With his well-rounded-out education, scholarly attainments, knowledge and skill, he could not have failed to gain a large practice even if he had not come to this city as a pioneer in a comparatively new field. At it was, the good John Green has been able to do to his fellow man was for many years limited only by the fact that the day had but 24 hours.

The poor and rich alike thronged his waiting room and blessed the great physician and his skillful hand which restored to them that most precious gift, sight.

While it was not his way to let the left hand know what his right hand did, we all know how great his charity was.

With all his work, he was ever of a cheerful spirit. He enjoyed his existence most in the company of good friends and was an admirable host. He took a great interest in general in science, literature, music and the other arts, history, archæology, the drama; in fact he had an open mind for everything furnishing higher enjoyment in the hours he could spare from his work.

Being so well versed in so many diversified subjects, he was an inspiration to those who came in contact with him and especially to the men who studied under him. He was an excellent debater and entertainer, with whom to converse was a pleasure and a delight. Especially was this shown in the meetings of the St. Louis Ophthalmological Society, whose presiding officer he was since its formation and in which he took a great delight to give to the benefit of its members as much as he could from his great store of knowledge, filled with a memory of details which even his age did not seem to impair.

That a man of such a character should have been a prominent member and a leader in many societies and gatherings of scientific men, here and abroad, is but natural, as is also, that the honors, such societies could bestow, were his in many instances. He was also given honorary degrees by the Washington University of this city, and by the University of Missouri.

John Green was in everything a conscientious man, and what after due deliberation he considered right he did not hesitate to uphold and, if necessary, to fight for.

As a friend he was of the best, most loyal and faithful, ever ready to even go out of his way to help a friend with counsel and deed.

There are many who can never forget him on this account. We, who have known him closer and have worked with him, surely cannot forget him. His death has left a gap which cannot be filled any more for his friends and science, than for his immediate family. ALT.

EDWARD NETTLESHIP.

1845 to 1913.

Edward Nettleship died October 30th. Science, and in particular British Ophthalmology, has suffered another heavy loss.

Nettleship began his work in ophthalmology in 1868 as assistant to Hutchinson, at Moorfields. In 1871 he was appointed Curator and Librarian. In 1873 was given charge of an isolation school for poor trachomatous children.

Later he was one of the staff of the South London Ophthalmic Hospital, and Ophthalmic Surgeon to the Hospital for Sick Children, Great Ormond Street.

In 1878 he was appointed Ophthalmic Surgeon to St. Thomas's Hospital and Lecturer at the Medical School. Later on, having resigned this position, he was appointed Consulting Ophthalmic Surgeon.

In 1882 he was made Assistant Surgeon and in 1887 Surgeon to the Royal London Ophthalmic Hospital, Moorfields, which position he held until 1898.

In these positions he showed himself an excellent surgeon and a very successful teacher. His scientific work was of the highest character. His papers are chiefly to be found in the Ophthalmic Hospital Reports and in the Transactions of the Ophthalmological Society of the United Kingdom. He was one of the founders of this Society. In the last years of his life, having retired from active practice, he devoted most of his time to the investigation of heredity in eye affections. His text-book on Diseases of the Eye saw a number of editions and was very popular, being in its time the best text-book in Great Britain.

MEDICAL SOCIETIES

SHORT REPORT OF THE IX. ANNUAL MEETING OF THE HUNGARIAN SOCIETY OF OPHTHALMOLOGY.

Held at Budapest September 7th and 8th, 1913.

By L. v. Liebermann, Jr., M.D.,
Assistant at the I. University Eye Clinic.

The Chair was first occupied by Dr. E. von Grósz, later by Dr. J. von Imre, sen.

FIRST DAY.

(1) *The Wilhelm Schulek Lecture.*—J. von Imre, sen.—*On the fate of anisometropic eyes.*—Based on examinations made on a large material, especially school children, the author showed that the full correction of anisometropic eyes is not only possible in the large majority of cases, but advisable in the interest of binocular vision and of normal muscular balance. In many cases methodical exercises for binocular vision have to be combined with it. This opens a wide field for the activity of the school physician with the necessary preliminary education.

(2) *E. Pólya.—Surgical Treatment of choked disk.*—On account of the rapidly developing loss of vision, choked disk always demands operative interference, which, when an accurate localization is possible, should be by a radical operation, or if not—and this will be the fact in most cases—by decompressive trephining. The author has performed the radical operation in 4, the decompressive trephining in 18 cases.

(3) *L. von Liebermann, Jr.—The diagnosis of foreign body injuries to the eye and the indication and technique of magnet extraction, with special reference to accurate localization.*—The accurate localization by Roentgen rays by means of specially constructed apparatus is the most important aid in diagnosis and indication in foreign body injuries to the eye. The author uses Sweet's method and proves its reliability in a number of cases. The locality, size and form of the foreign body thus found, influence to a large degree the technique of operation and by its means the two chief types of giant magnets, Haab's and the inner pole magnet, are given their special indications. (This paper will appear in the *Arch. f. Augenhlk.*)

(4) *E. von Grósz.—Basal iris excision against glaucoma.*—Lagrange's and Elliot's sclerotomies seem to be most successful when they are combined with excision of the periphery of the iris, and not when a complete iridectomy is performed. The author has made a series of basal iridectomies with preservation of the sphincter muscle and the results were good. This operation is well founded in theory, since by preserving the sphincter, miotics can still contract the pupil and free the filtration angle.

(5) *B. Spanyol.—Fat transplantation after evisceration of the globe* (with demonstration of patients).—This operation is to be recommended in all cases in which the danger of sympathetic ophthalmia is absent, instead of enucleation. The fat is best taken from the gluteal region. This implanted fat is partially absorbed, partially replaced by new connective tissue. The cosmetic effect is better than after fat implantation into Tenon's capsule after enucleation and much better than simple enucleation.

(6) *M. Mohr and S. Beck.—Papillitis as an early symptom of lues.*—The author confirms Japha's statement, that in a large per centage of the syphilitic newly born and sucklings optic neuritis is found. Of 128 syphilitic sucklings examined, 62 had with certainty papillitis; in 19 this was doubtful. In 47 cases there was nothing abnormal.

Papillitis is often the only early symptom and is pathognomonic.

(7) *I. Waldmann.—The diathermy in ophthalmology* (with demonstration of patients.)—Diathermy is a valuable therapeutic agent in different chronic inflammatory affections of the eye, especially in iridocyclitis and parenchymatous keratitis. The main point is that with diathermy the temperature of the interior of the eye can be raised considerably (1 to 1.5 degree). This is impossible with warm applications, thermophores, etc.

DEMONSTRATIONS.

1. M. Mohr.—Patients treated with neosalvarsan.

2. E. Pólyo.—Operation of congenital ptosis by free transplantation of fascia.

3. L. Vermes.—(*a*) A case of congenital distichiasis. (*b*) Neurofibroma ganglionare multiplex orbitæ (specimen).

4. L. von Liebermann, Jr.—(*a*) New international test cards (for Hungary).

(*b*) Instrument to hold bifocals before the eye.

(*c*) Intraocular cysticercus.

(*d*) Congenital ptosis operated on after Eversbusch.

(*e*) Enucleation and fat implantation into Tenon's capsule.

(*f*) Albuminuric retinitis in pregnancy cured by abortus.

5. B. Spanyol.—Instrument to measure the distance of lenses.

6. J. von Imre, Jr.—(*a*) 2 cases of partial aplasia of the oculomotor nuclei.

(*b*) Tower skull with cerebral hernia.

SECOND DAY.

(1) *L. Polyák.—On intranasal dacryocystotomy* (with demonstration of patients).—The author was the first to recommend and perform the opening of the chronically inflamed tear sack from the nose with the formation of a broad communication à la Toti. A flap of mucous membrane and periosteum is removed, then the frontal process of the superior maxilla and the lacrimal bone are chiselled off until the medial wall of the lacrimal sack is visible, which is now wholly removed. The author has operated in this manner on 42 cases, several of whom he presented.

(2) *J. von Imre, Jr.—The operation of scars which adhere to bone* (with demonstration of patients).—Scars at the temporal end of the infraorbital margin due to tubercular periostitis can be permanently loosened from their fixation by fat transplantation. The author explained his method and presented several cases operated upon who showed a good cosmetic effect. (This paper will appear in German.)

(3) *A. Rados.—On the development of complement binding antibodies after treatment with homologous tissue cells and remarks on the anaphylactic origin of sympathetic ophthalmia.*—The author sums up the results of his experiments as follows:

The isoantibodies after immunization with homologous choroidea gave, besides with choroidea, also with cornea and kidney tissue as antigen, a complete inhibition of hæmolysis. Cornea and kidney sera acted similarly.

The antisera produced in rabbits gave also with heterologous antigens (ox cornea and ox choroidea) a complement fixation.

From this it follows that the isoantibodies formed with homologous cornea, choroidea and kidney tissue are not specific for the kind or organ.

These results contradict Elschnig's theory of sympathetic ophthalmia, according to which it is due to autoanaphylaxy produced by the organ specific destroyed uveal pigment. (Has appeared in *Zeitschr. f. Immunitasf,* XIX, p. 579)

(4) *G. Ditrói.—The orthopædic treatment of convergent strabismus.*—Orthopædic treatment alone is in place in low grade and recent strabismus (about to 10 degrees). With higher degrees of strabismus it leads to success only when combined with operation, and is usually necessary in these cases in order to complete the effect, or rather secure it. It is, of course, necessary to correct the often anisometropic error of refraction most accurately. High grade amblyopia (up to 5/50) forms no obstacle to the exercises. The latter are made in the following manner. The first object is to produce binocular vision; with one-sided amblyopia this is best done with Krusius' amblyoscope. Then fusion must be brought about by means of the afterimages. Meanwhile the exercises for the monocular amblyopia must be continued. When fusion has been established its amplitude must be devolped. This is best done with Dahlfield's stereoscope. Finally the perception of depth must be exercised.

(5) *I. Markbreiter.—The relation of astigmatism to the total refraction of the eye and the accommodation.*—The author tries to prove by mathematical deductions that the total astigmatism of the eye is increased during accommodation and to such a degree that it can in practice not be neglected.

He, also, showed mathematically why with different refraction it is not possible to correct the total astigmatism in the same manner. (It is impossible to give a short résumé.)

(6) *I. Markbreiter.—On the rhinological importance of the enlargement of the blind spot.*—Based on the examination of 100 cases of inflammation of the accessory sinuses, the author contradicts the opinion of van der Hoeves and de Klejns, that by means of the enlargement of the blind spot a differential diagnosis is afforded between purulent inflammation of the anterior and posterior accessory sinuses. He found the same symptom both in purulent inflammation of the anterior and of the posterior sinuses.

While contralateral eye changes in general were often observed, also, bilateral eye changes with monolateral empyema, and vice versa, the earliest symptom was most frequently an enlargement of the blind spot on the same side. This is of diagnostic value. The author further stated that enlargement of the blind spot as a more frequent early symptom than a central scotoma.

(7) *J. Davidovics.—Serological studies on eye patients.*—The author reports his results of the Wassermann reaction made in about 150 cases of eye diseases.

The result is that the reaction seems to be even more of diagnostic value in eye diseases than in other diseases, since syphilitic eye affections give almost always a positive and very rarely a negative reaction. A negative result, therefore, speaks with great probability, although not certainty, against a syphilitic affection, much more so than is the case in the statistics of other affections. This fact may, perhaps, be explained that in order to produce eye affections a special degree of virulency of the syphilitic virus is necessary, which influences the chemismus of the organism to a higher degree.

It is especially dwelt on that inflammations of the choroid give a positive Wassermann in a very small percentage, which shows that tuberculosis plays a greater role in choroiditis than has hitherto been accepted.

(8) *L. von Blaskovics.—On Kugel's operation.*—The author has performed Kugel's operation for the removal of the tarsus of the lower lid for senile ectropium in 5 cases, twice in conjunction with the Kuhnt-Symanowski shortening of the lid, and is satisfied with the results of this combination, since Kugel's operation alone is not quite satisfactory.

As to the explanation of the manner of its action, the author does not agree with the originator of this method. The removal of the tarsus alone cannot relieve the ectropium, since the thickening of the tarsus is the consequence and not the cause of the senile ectropium. The effect can be explained much better by the strengthening of the musculus subtarsalis. The fibres of the orbicularis which run along the lower margin of the tarsus are the antagonists of the subtarsalis, since they press the convex edge of the tarsus against the eyeball and thus tend to remove the lid margin from it. By the removal of the tarsus the point of fixation for these fibres is removed, and thus the muscular fibres of the lid margin are indirectly strengthened.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

A meeting of this Section was held on Wednesday, November 5th, 1913, Sir Anderson Critchett, Bart., F.R.C.S., President of the Section, in the Chair.

Mr. Sydney Stephenson showed a case of brawny scleritis at an early stage, which Mr. Treacher Collins thought was a tenonitis. He had had a case of this condition, which persisted for a long time, as had this one. Mr. Holmes Spicer reminded the meeting of a case with a similar appearance which he showed at a former meeting, under the title "solid œdema of the conjunctiva." That, however, had a syphilitic origin, which, apparently, was not the case here. Dr. Deighton Davies spoke of a case under his care with a similar appearance. A small portion examined showed round cells without a stroma. He enucleated, and on bisecting the globe, found a darkly pigmented sarcoma. He suggested the present case was sarcoma.

Mr. J. L. Barley showed a case of keratitis punctata, and Mr. Killick one of persistent hyaloid artery.

Mr. A. S. Cobbledick showed an example of ectasia of the cornea four years after a perforating wound; and a case of rupture of the choroid in a myope following labor. The latter case he regarded as unique.

Mr. Bishop Harman showed a patient with a new growth causing detachment; and Mr. George Coats exhibited a dog with keratitis. Mr. Chatterton showed a case of tubercular iritis, in order to elicit opinions as to the value of tuberculin injections for the condition. Mr. Browning said he had treated a number of such cases with tuberculin, and he knew of no case in which hæmorrhage had followed its use. The French believed the hæmorrhages which occurred were of tubercular origin. Mr. Mayou stated that he had treated numerous cases of tubercular iritis with tuberculin, and had not seen hæmorrhages during the treatment; there was absorption of the nodules, and subsidence of the iritis. It was the most successful treatment. He commenced with 1/10,000th, and worked up to 1/250th T.R. Where there was lung trouble also, a very small dose caused severe reaction, and it should be given very cautiously. Mr.

Macnab said he had recently treated two cases in this way, and both did very well. Mr. Arnold Lawson gave confirmatory experience.

Mr. Parsons showed a central unilateral retinitis, and Mr. Hugh Thompson a case of choroiditis starting as a ring round the macula.

THE LATE MR. NETTLESHIP, F.R.S.

The President made sympathetic reference to the death of Mr. Edward Nettleship, which was a loss not only to the Society, but to the world of ophthalmology. Though evidently in failing health, his mental vigor was such that he took part in the discussions at the recent Congress of Medicine. The speaker's father and Mr. Bowman had the highest opinion of Mr. Nettleship's pathological knowledge in the early days, and that opinion had been amply justified since. A resolution of condolence with his relative was carried by members upstanding.

Mr. G. Coats read a paper in which he reported some examples of disease in the animal eye. He described a form of keratitis characterized by the presence of a superficial vascular opacity of the cornea. The disease was of long duration, and had no evident association with distemper or other general illness. It sometimes occurred in more than one member of the same litter. Pathologically, it consisted in a replacement of the superficial layers of the cornea by a layer of inflammatory tissue. The human condition which it most nearly resembled was trachomatous pannus, but it differed from that disease in the absence of follicles, and of scarring or distortion of the lid, as well as by its not being confined to the upper part of the cornea. A case of retinal degeneration following distemper was described. The retinal changes were peculiar in that it was the bipolar cells of the inner nuclear layer which were chiefly affected, the ganglion cells showing only slight, and probably secondary, changes, the outer layers being mostly intact. In places, however, the rods and cones and their nuclei were also atrophied. These changes were probably to be explained by the presence of a circulating toxin with a specific affinity for the retinal bi-polars, analogous to the specific action of nicotine on the ganglion cells.

A description of some cases of choroido-retinal degeneration and inflammation was prefaced by a discussion of the pathological points of distinction between these two conditions. A pro-found atrophy of the retina without adhesion to the choroid must be a degeneration. In old-standing cases of degeneration, however, an adhesion between the two membranes occurred, but it was usually not very intimate; the line of demarcation remained well defined, and the elastic lamina of the choroid was intact. The occurrence of cicatricial tissue was certain proof of precedent inflammation, and where it was present, the adhesion was dense and the layers of the choroid and retina were distorted and disorganized, instead of being merely atrophic. A degeneration was often fairly uniform over a considerable area, an inflammation was patchy.

Examples of choroidal-retinal degeneration in a dog, raccoon, wolf, wild sheep, ferret, wallaby and hyæna were shown. The raccoon appeared to be an albino, yet a little pigment was present in the epithelium of the ciliary body and anterior part of the choroid, showing that pure albinism could not be diagnosed without a microscopical examination. The raccoon also showed nystagmus, a condition occasionally described in the lower animals. A case of choroiditis, cyclitis, and keratitis in a bear, and one of anterior choroiditis in a peccary were also illustrated. Two instances of canine irido-cyclitis were reported. The first was of plastic type, and was peculiar only in its occurrence in the dog, in which animal the condition appeared to be rare; the second, also in a dog, was characterized by an enormous thickening of the iris, due to infiltration with mononuclear cells of a special type. Posterior synechiæ and other features of plastic iritis were absent. The cause of the irido-cyclitis was obscure in both instances.

The paper was discussed by Mr. Treacher Collins, Mr. Lawford, Mr. Sewell (veterinary surgeon), Mr. Rayner Batten, Mr. Bishop Harman, Mr. Holmes Spicer, Mr. Lang, Mr. Cruise, and the President, and Mr. Coats replied.

Mr. Charles Wray read a paper on "Obstruction of the Lacrimal Duct and its Treatment." He believed it was a mistake to remove the sac when syringing failed, without attempting to cure by means of styles, or styles and probing combined, and thought it was not unlikely that ectropion and its sequelæ might follow excision. Too much was heard of the satisfactory and immediate results, but too little of bad ones and of recurrences. After referring to the danger of adrenaline and chloroform when used at the same time, stress was laid on Harrison Butler's operation. According to the author, all cases of epiphora should be rhinoscoped, though he admitted he had received little or no help from the rhinolgist. The author treated his cases in the following way. He injected cocaine by Mellen's method, and instilled a drop into the conjunctival sac. A Bowman's probe was then passed into the sac, and the point pushed forward under the palpebral ligament. He then cut down the guide, taking care to note the click of the knife on the probe. So far, the procedure was quite painless. He then placed crystals of novocaine in the sac, and had recourse to probing. At times, if the stricture was impermeable, he forced a passage through the posterior wall of the duct. A piece of strapping was then placed just below the sac, so that the style did not press on the skin. A special style—gold-plated, and obtainable from Courlander, of Croydon—was then passed, and the latter was so constructed that when a piece of strapping was placed on its arms it could not move. Whilst it was *in situ,* argyrol 5 per cent. was used three times a day, or such other application as might be desirable. Later, when a firm-edged fistula had formed, the patient was instructed to irrigate the sac three times a day, passing the style at night, and taking it out in the morning. To cure the fistula it could be dilated, and whilst stretched, all the cicatricial tissue cut away, after which the edges of the wound were brought together and covered with collodion. He proceeded to criticize the operations of Toti, Eichen and West. The first of these consisted in making a large open window between the sac and the nose, and as the nose in cases of lacrimal obstruction was so very often diseased, the operation, in his judgment, could scarcely receive the approval of ophthalmic surgeons. Also the patient experienced considerable annoyance on blowing his nose, and the operation provided no vertical tube like the duct, to carry a flow of tears opposed to the entry of organisms to the sac.

Eichen side-tracked the tears to the antrum, i.e., converted this cavity into a pool of stagnant tears. It also had the same objection as those urged against Toti's operation.

West's operation was for obstruction low down in the duct, and consisted in removing its nasal wall. It was better than the two foregoing operations, as some of the duct was left, but it had the serious objection that autolavage and autoprobing were impossible. The aim of the operation was to make a permanent fistula in the middle meatus, but the task of making one is erectile or semi-erectile tissue in a canal, the size of a crow-quill, was almost impossible; but in the event of the duct being kept open by constant probing via the nose, or canaliculus, the erectile tissue would be so damaged that a fibroid stricture would be bound to follow. He said his object was not so much to attract attention to his own operation, as to obtain a formal expression of opinion as to the value of the newer operation of Toti, West, and Eichen.

ABSTRACTS FROM MEDICAL LITERATURE.

By J. F. Shoemaker, M.D.,
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METASTATIC OPHTHALMIA.

REPORT OF THREE CASES, ONE OF WHICH RESULTED IN RECOVERY OF VISION.

William H. Wilder (*Jour. A. M. A.*, September 27, 1913, Part 2) reports three cases of metastatic ophthalmia, one in which both eyes were involved, with loss of vision in both, the patient dying twelve days after the infection of the eyes, from general sepsis. The trouble evidently arose from a purulent cystitis. Bacillus coli communis were found in cultures from the urine and staphylococcus aureus from the blood. In the second case the trouble began with a severe attack of tonsillitis, followed by a suppurative otitis media. Some weeks later one eye became involved and the vision of this eye was destroyed, the globe becoming shrunken. Streptococcus seemed to be the germ responsible for the trouble. The third case followed an attack of pharyngeal diphtheria. The ocular trouble seemed to be limited mostly to the anterior portion of the eyes and after the prompt use of antitoxin, together with subconjunctival injections of salt solution, recovery ensued with normal vision in both eyes.

Concerning the ætiology of this condition, the author points out the fact that since the introduction of antiseptic methods in obstetrics and surgery it is met with much less frequently and that the cases that occur now are largely cryptogenetic in character or follow some infectious disease. The prognosis is not only bad as to the eyes, most of them having the vision destroyed if not the globe, but also as to the life, the mortality being high in these cases, especially when both eyes are attacked. The death rate ranges from 21 per cent. in the unilateral cases to 85 per cent. or more in the bilateral cases.

THE PATHOGENESIS OF CHRONIC UVEITIS, EXCLUDING THE SYPHILITIC, TUBERCULOUS AND SYMPATHETIC VARIETIES.

G. E. de Schweinitz (Pamphlet, giving Report read before the Section on Ophthalmology of the Seventeenth International Congress of Medicine, London, August 6-12, 1913) discusses this subject at some length, deriving his material from:

1. An analysis of some of the most important literature published during the past ten years.
2. A collective investigation of the views and experiences of American colleagues in this and allied diseases of the uveal tract.
3. A study of so-called gastro-intestinal auto-intoxication in relation to these affections.

The following general conclusions are offered:

Inasmuch as acute articular rheumatism (rheumatic fever) is rarely, if ever, a cause of iridocyclitis (uveitis) and inasmuch as various types of myalgia (muscular rheumatism) and polyarthritis are in largest measure not strictly rheumatic affections, it seems advisable to discontinue the term 'rheumatic iritis', or 'iridocyclitis', and to substitute for it some title which does not commit us to an unproven ætiologic factor. Thus far the one suggested by Mr. T. Harrison Butler, to-wit, 'autotoxæmic iritis', although not a definite one, seems best to fulfill the indications.

Uveitis (iritis and iridocyclitis) occurring in the subject of various forms of polyarthritis is doubtless due to the same cause which creates the joint affections; what the cause is thus far has not been discovered. Similar ocular affections in the subjects of various myalgias (muscular rheumatism) should probably be regarded as manifestations of the same infection or toxæmia which causes the muscle and fibrous-tissue pains and lesions, and, although the so-called rheumatic diathesis has been brought forward as an ætiologic factor in this disease, in the absence of definite knowledge concerning its pathogenesis, a more explicit statement as to its causation, and therefore as to the causation of the iridocyclitis with which it may be associated, cannot be made.

Evidence is lacking that the relationship between gout and various diseases of the uveal tract (uveitis, iridocyclitis) should be abandoned, in that no satisfactory proof has been presented that the same cause which produces the various manifestations of gout, for example, eczema, joint lesions, etc., may not also produce a chemic inflammation of the uveal tract. It is not unlikely that diabetes, but much more rarely, can be accused in the same manner.

There is satisfactory evidence, clinic and bacteriologic, that the majority of cases of uveitis (iridocyclitis) are caused by micro-organisms or their toxins. Potent in this respect (omitting those excluded from this discussion) the gonococcus and the staphylococcus are conspicuous. Other bacterial elements doubtless may play a similar role.

That the gonococcus is the cause of many cases of iritis and iridocyclitis is unquestioned, and that it is the cause of many cases ordinarily classified as 'rheumatic' is undoubtedly true; that it may be the cause of chronic insidious uveitis, especially as it occurs in women, has not been definitely proved, but it cannot be entirely excluded from the list of those micro-organisms which are potent factors in this disease.

The primary source of infection from which the staphylococcus proceeds and reaches the uveal tract, there to create an inflammation, in all probability most frequently is a chronic septic process in the mouth (pyorrhœa alveolaris), in the tonsil, in the naso-pharynx, in the accessory nasal sinuses, in the intestines, in the uterine cavity, in the skin (boils, furuncles, etc.).

It is probable that in most instances the living bacteria reach the uveal tract, and by their presence and their elaborated toxins bring about the various types of inflammation which are classified under the general term 'uveitis', the process being a non-suppurative one on account of the modification which these bacteria undergo in their passage through the blood-streams.

Although the term 'inflammation', as ordinarily defined and conceived, comprehends a pathologic condition characterized by the presence of bacteria at the site of activity, there is much evidence to show that lesions possessing all the fundamental characteristics of similar lesions which result from the immediate action of living bacteria can be brought about by bacterial toxins, and that in these lesions there is nothing to suggest that in the course of their development bacteria were immediately present (Abbott). Therefore, while proof may be lacking that bacterial toxins circulating in the blood are capable of causing localized inflammations of the uvea, proof is equally lacking that such is not the case. Indeed, we are not justified in denying that these toxins have this power, unless we are also willing to reject the theory of specific combining affinities.

As it is possible to speak intelligently of auto-intoxication only when poisons are formed by the tissues of the body itself, that is within the metabolism, and are not introduced through specific bacterial infections, and as we have no accurate knowledge of these toxins, it would seem wise to discontinue the term 'gastro-intestinal auto-intoxication', although freely admitting that gastro-intestinal intoxications of bacterial or parasitic origin are potent sources of infection.

Although indican, when found in excessive amounts in the urine (indicanuria) is an index of intestinal putrefaction, its absence does not prove that a gastro-intestinal intoxication is not present, nor is it proper to depend upon the presence of this substance alone for information in these respects. If after thorough analysis urobilin, phenol, increase in the percentage of ammonia output, excess of fatty acids, and increase of conjugate sulphates above 200 mgm., etc., are determined, intestinal putrefaction dependent upon the activity of bacteria on the food-stuffs in the intestines has been demonstrated. These analyses do not in any way prove that any toxic substance elaborated in the course of a so-called gastro-intestinal auto-intoxication, that is, a toxin formed within the metabolism, can by its toxic properties produce a uveitis, but they do prove the bacterial activity to which reference has been made, and indicate a source from which these bacteria or their toxic products may proceed and cause an inflammation of the uveal tract, exactly as bacteria or their toxins from other foci have a similar influence. In this sense, therefore, gastro-intestinal intoxications have a definite right to be included among the ætiologic factors of uveitis.

Chronic insidious uveitis, especially as it occurs in women, who are often anæmic, is in all probability most frequently excited by bacteria or bacterial toxins which have come from foci or chronic sepsis, particularly in the mouth, the tonsils, the sinuses, the pelvis, and the gastro-intestinal tract.

While indicanuria certainly has not been proved to have the relationship to the development of certain types of chronic and relapsing uveitis (iridocyclitis) that has been given to it by some writers, there is good reason, as Elschnig insists, to study patients with these diseases of the eye from the metabolic standpoint. This study, however, should not be confined to the ordinary tests for indican in the urine, but should include a thorough investigation of the patient's metabolism. It is probable that such studies may eventually lead to the establishment of a definite group of diseases of the uveal tract called into existence by infections of bacterial origin arising in the intestinal tract.

A NOTE UPON ESSENTIAL OILS IN THE TREATMENT OF IRIDO-CYCLITIS.

Arthur Zorab (*The Ophthalmoscope,* July, 1913) finds the essential oils of cinnamon, cloves and peppermint of material assistance in cutting short attacks of iritis and irido-cyclitis. Although not sure it has any advantages over the other oils the writer generally administers the oil of cinnamon. It is always given in capsules after eating and in doses varying from two minims three times daily to four minims every four hours. Gonorrhœal cases respond very well to this treatment but the most marked results are obtained in those cases where the ætiology of the trouble is obscure, such as might be attributed to oral or intestinal sepsis, etc. Obstinate cases of scleritis and interstitial keratitis have also responded to this treatment very well.

SYMPATHETIC OPHTHALMIA.

Prof. A. Elschnig (*Trans. Am. Academy of Oph. and Oto-Laryn.,* 1912) points out the weak places in the different theories that have been advanced to explain the cause of sympathetic ophthalmia, especially the migration theory and the metastasis theory, showing that they fail to explain some of the facts pertaining to this condition. He advances another theory which he calls the anaphylaxis theory and which he thinks explains the conditions found in sympathetic ophthalmia. According to this theory any injury or disease of an eye whereby the uveal tissue is damaged may cause a resorption of the uveal tissue and pigment in antigenic form and antibodies are set free in the blood, thus sensitizing the uvea not only of the injured eye but of the second eye also. Any auto-intoxication or constitutional anomalies present at the time or occurring subsequently may act as the remaining factors in the ætiology of sympathetic ophthalmia. He says:

All the appearances in the picture of sympathetic ophthalmia which cannot be explained by the previously mentioned theories are easily understood on applying the anaphylaxis theory. They are as follows:

1. The time interval between the inflammation of the first eye and the sympathetic inflammation of the second eye. For the formation of antibodies, through the resorption of an antigen in an animal's body, at least ten days are required, for anaphylaxis, likewise about twenty days are necessary. This explains why the sympathetic inflammation has an incubation period of at least fourteen days, and why it occurs most often within four weeks after the trauma. Again it explains why eyes that are enucleated at any time for prevention of sympathetic ophthalmia almost never show the anatomic picture of the sympathizing inflammation. If my theory is correct, then both uveas must be sensitized at the same time, and the picture of anaphylactic inflammation occurs at the same time in both eyes. In other words, the anatomic picture of the sympathizing inflammation only occurs in an eye which has been enucleated on account of the fear of sympathetic ophthalmia, when the second eye is already involved—a fact which is clearly shown by the cases of Fuchs.

2. If after a long interval of time a sympathetic inflammation arises, a fresh anaphylactic inflammation occurs always in the first eye. It is evident that a constitutional anomaly or an auto-intoxication may only at a late date effect an antigenic resorption of uveal tissue with sensitizing of both uveas, or produce the inflammation of the sensitized uvea tissue.

3. My theory of sympathetic ophthalmia explains how sometimes in the second eye there may develop a pronounced sympathetic inflammation a few days after the enucleation of an eye, which shows the anatomic changes of the exciting inflammation in the early stage. In this case both eyes are suffering from the same inflammation, but in the second eye it was not yet sufficiently developed to be clinically manifest. It explains, moreover, why the sympathetic inflammation of the second eye may occur still some little time after the enucleation of the exciting

eye. For while the source of the production of antibodies against uveal tissue is done away with by the enucleation, sufficient antibodies remain in the body for the sensitizing of the second eye.

4. My theory also shows why enucleation of the exciting eye has no special effect on a sympathetic ophthalmia already established.

5. It explains why a sympathetic ophthalmia never follows after panophthalmitis. In panophthalmitis the uvea tissue and pigment is not slowly damaged as in chronic cases of iridochoroiditis, but totally destroyed, and therefore cannot give the cause for production of antibodies against uveal tissue, and cannot produce a sensibilization of the fellow uvea. It is well known that also after parenteral injection of the very prominent antigen, as typhus bacillus, there never results the production of antibodies, if the injection becomes suppurative.

6. The anaphylactic theory explains why neurotomy and neurectomy are of no value as measures to prevent sympathetic inflammation, since the formation of antibodies is thereby not interfered with, nor is sensitization prevented.

7. My theory shows that exenteration of the bulb is of equal valuation with enucleation for the prevention of sympathetic ophthalmia—provided it is carefully done. It is known how exceedingly early in an injured eye the sympathizing inflammation may extend to the orbital cell tissue. This must prove to the advocates of the bacterial theories that the infective agent of sympathetic ophthalmia invades the orbit. How can they explain that enucleation has any value to prevent sympathetic ophthalmia if they leave after enucleation microörganisms in the orbital tissues? And does not also exenteration always leave behind bacteria in the sclera, and yet it is as good for prevention of sympathetic ophthalmia, as enucleation? The anaphylactic theory, however, makes it clear that alone the removal of the uveal tissue is the desideratum, and that this is accomplished by an exenteration of the bulb as well as by enucleation. The few cases of sympathetic ophthalmia which recently have been reported as occurring late after exenteration have shown by the anatomic examination, that uveal tissue was left behind in the scleral capsule. The break-down products of this tissue could have sufficed for the anaphylactic sensitization.

8. Further, the anaphylactic theory explains without any difficulty those cases of sympathetic ophthalmia after non-perforating wounds, as well as after sarcoma of the uvea, which cannot be satisfactorily explained by the mycotic theories. In fact, the frequent occurrence of sympathetic ophthalmia after blunt traumatisms, subconjunctival traumatic rupture of the sclera, and sarcoma of the chorioid, where there is only a breaking down and not a suppuration of the delicate uveal tissues, is in my opinion of weighty support to my theory.

NOTICE.

At the end of February, 1914, a new Ophthalmic Journal is going to be published by A. Bielschowsky (Marburg), A. Elschnig (Prag), E. Hertel (Strassburg), E. von Hippel (Halle), F. Schieck (Koenigsberg) and A. Siegrist (Bern). It will be edited by W. Krauss (Marburg). The name will be "*Zentralblatt fuer die gesamte Ophthalmologie und ihre Grenzgebiete.*"

Its object will be to furnish the ophthalmologist with a full report on his whole practical and scientific field of labor. There will be single references as well as critical collective reviews by well-known and competent writers, so that it will form a complete annual report on ophthalmology. It will appear every two weeks, about two volumes per year of 600 to 700 pages. The price of each volume will be 25 marks.

It will be published by Julius Springer, Berlin W. 9, Lingstr. 23-24, to whom subscription should be addressed.

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